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The *Blue Jay*, founded in 1942 by Isabel M. Priestly, is a journal of natural history and conservation for Saskatchewan and adjacent regions. It is published quarterly by the Saskatchewan Natural History Society, Box 1784, Saskatoon, Saskatchewan. S7K 3S1. CN ISSN 0006-5099.

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SNHS NATURE TOURS — 1984

The following nature tours may be organized by the society during 1984. Interested participants should write to Stan Shadick, 3F-1800 Main St., Saskatoon, Saskatchewan. S7H 4B3. Tour prices (where listed) cover all costs except meals and train/air fare.

Cypress Hills, Sask. (Sage Grouse) April 20-22 ($150)
Point Pelee National Park, Ont. May 7-13 ($695)
Churchill, Man. June 22-27 ($495)
Vancouver, B.C. CNF Conference mid-July
Sach's Harbour/Inuvik, N.W.T. July
Cambridge Bay, N.W.T. July
Saskatoon, Sask. (Whooping Cranes) October 6

NOTICE OF ESTABLISHMENT OF JEAN AND JOHN HODGES ANNUAL AWARD TRUST FUND

The Anthropology Department of the University of Regina has begun and is soliciting contributions for a scholarship fund in Anthropology in Jean and John Hodges' names. Specifically this scholarship will be set up to yield increasing interest with an increasing principal over time. Thus a scholarship in Jean and John's name should be permanent and will grow over time. The scholarship will be given each year to a second year or higher student majoring in Anthropology who has a specific concern with Archaeology or Physical Anthropology.

Your support would be greatly appreciated. Tax deductible donations in any amount will be received by the University of Regina Controller (Mr. Stu Mann) for the "Jean and John Hodges Annual Award Trust Fund". — *Charles R. Watrall,* Department of Anthropology, University of Regina.

THE NEW BIRD IDENTIFICATION BOOKS

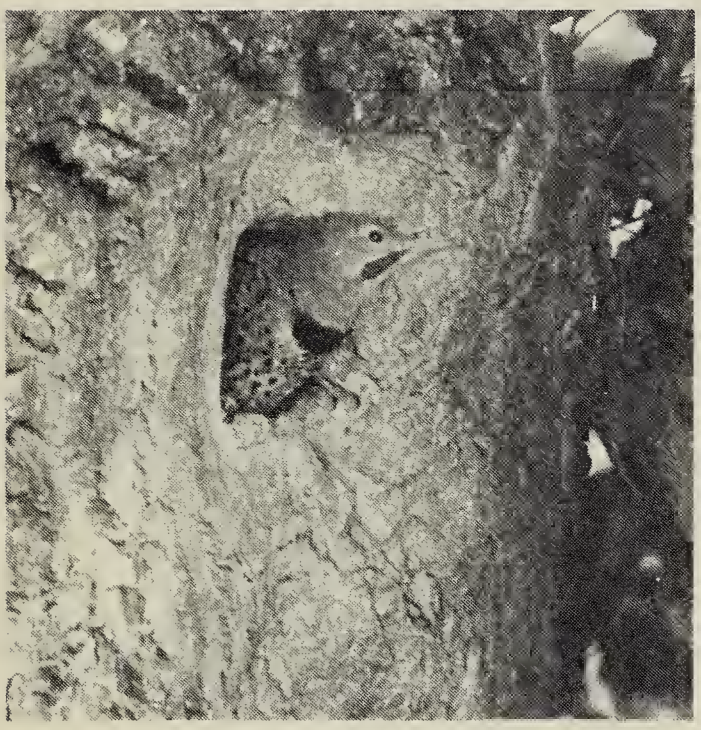
J. B. GOLLOP, Canadian Wildlife Service, 115 Perimeter Road, Saskatoon, Saskatchewan. S7N 0X4

If all species of birds shared one characteristic of the Blue Jay — a similar plumage for adult and young, male and females, spring, summer, fall and winter — one revised and 2 new identification guides would not have appeared just in time for Christmas, 1983. But they do not and they did and this article attempts a review of 2,452 pages of 6 volumes under 4 titles. At the outset, however, readers should keep in mind that a reviewer's opinions are but one person's point of view. Note a discrepancy in the following from 2 reviews of Peterson's 1980 guide: one reads: "The *Catharus* thrushes are too plump and shown in a posture that suggests that they walk like an Ovenbird rather than hop as thrushes typically do."[5] The other proclaims: "These portraits range from superb (the 'brown thrushes' on page 223) ..."[6]

The 4 titles reviewed in paperback editions are:

PETERSON, R.T. *1980. A field guide to the birds of eastern and central North America.* Houghton Mifflin, Boston. 4th edition. *Pages:* 384 in 1 vol. *Size:* 180 x 112 x 18 mm (7.1 x 4.4 x 0.7 in.). *Weight:* 435 g (1.0 lb) *Writers:* 1. *Artists:* 1 (same as writer). *Pages of bird plates:* 136. *Number of species:* 583 illustrated of which 131 are on 8 plates of stragglers. *Maps:* 390, 6 per page at end, 56 x 50 mm (2.2 x 2.0 in.), mainly eastern North America and regional maps. *Introduction:* 22 pages, including books on songs, nests and good birding areas, Peterson identification system, area of guide, about maps, ranges, drawings vs. photographs, subspecies, acknowledgements, map, life list, how to identify birds (7 pages), parts of a bird (34 labels), definitions. *Sequence of species:* from aquatic to less aquatic to land birds, the latter partly in American Ornithologists' Union (AOU) order and partly in groups of similar species.[8] *Species treatment:* usually 4 paragraphs, 5 headings, facing illustration; length, sometimes wingspread, more often a single value (rather than a range) in inches and cm; description, similar species, voice, worldwide range, reference to map (or range if no map), habitat. Uses old and new official and his own bird names.[8] *Special features:* arrows on plates pointing to diagnostic field marks. *Price:* $13.95 paperback, $19.95 hardcover.

ROBBINS, C.S., BERTEL BRUUN and H.S. ZIM. *1983. A guide to field identification. Birds of North America.* Golden Press, New York. Revised edition. *Pages:* 360 in 1 vol. *Size:* 190 x 118 x 17 mm (7.5 x 4.6 x 0.7 in.). *Weight:* 375 g (0.8 lb.). *Writers:* 3. *Artists:* 1. *Pages of bird plates:* 172. *Number of species:* 810± illustrated (from introduction). *Maps:* 602± with species, 25 x 25 mm (1 x 1 in.), North America and regional. *Introduction:* 12 pages, including definitions, how to use book, bird songs, sources of recordings, describing birds, birdwatching, parts of a bird (44 labels). At the end of the guide is a list of 33 important bird books. *Sequence of species:* families are generally in AOU order but similar species are grouped within families. *Species treatment:* one paragraph, no headings, facing illustration; length, occasionally wingspread, a single value in inches only; abundance, food and behaviour (sometimes), breeding habitat, description, comparison, song. Four old names are retained (Louisiana and Green herons, Barn Owl, Common Flicker); other old names are given in index only. *Special features:* 320± sonagrams (prints of bird songs showing length and frequency range), monthly spring migration lines and migration route on map, length of bird in live position (not stretched out as in other books), index with boxes for life list. *Price:* $9.95 paperback, $12.95 hardcover.



Northern Flicker *James Hamilton*

SCOTT, S.L. (editor). *1983. Field guide to the birds of North America.* National Geographic Society, Washington, D.C. *Pages:* 464 in 1 vol. *Size:* 204 x 127 x 22 mm (8.0 x 5.0 x 0.9 in.). *Weight:* 650 g (1.4 lb.). *Writers:* 8. *Artists:* 13. *Pages of bird plates:* 220. *Number of species:* 806 illustrated (advertising implies "nearly 800"). *Maps:* 640 with species, 23 x 26 mm (0.9 x 1.0 in.), North America and regional. *Introduction:* 12 pages, including bird names, plumages, parts of a bird (42 labels), behaviour, definitions, birding, binoculars, telescopes, checklists. *Sequence of species:* from aquatic to less aquatic to land birds, the last in AOU order for families but similar species grouped together within families. *Species treatment:* one paragraph, no headings, facing illustration; length, sometimes wingspread, usually one value in inches and cm; description, comparison, food and winter range (sometimes), habitat, songs and calls, previous name (if applicable). Special Features: 2400 different plumages, index with boxes for life list. *Price:* $19.95 paperback.

FARRAND, JOHN, JR. (editor). *1983. The Audubon Society master guide to birding.* Knopf, New York. *Pages:* 447 in Vol. 1, loons to sandpipers; 398 in Vol. 2, gulls to dippers; 399 in Vol. 3, Old World warblers (kinglets) to sparrows. *Size:* 204 x 126 x 61 mm (8.0 x 5.0 x 2.4 in.). *Weight:* 1970 g (4.3 lb.). *Writers:* 61. *Artists:* 13. *Photographers:* 208. *Pages of bird plates:* 510 (1245 photos, 193 paintings), plus 422 marginal drawings. *Number of species:* 719 illustrated plus 116 dealt with by text only at 6 or 7 species per page. *Maps:* 650 with species, 33 x 27 mm (1.3 x 1.1 in.), North America and regional. *Introduction:* 24 pages, identical in each volume and including acknowledgements, about the Audubon Society, preface, introduction, parts of a bird (40 labels), how to use book, map, how to identify and find birds, a review of orders in the particular volume. After the main species treatments there are 21 to 31 pages of material made up of 5 to 7 pages of accidentals, glossary (4 to 6 pages), brief author and artist biographies and credits. These sections appear in each volume. In addition, Vol. 1 has 3 pages on classification and nomenclature; Vol. 2 has 9 pages on birding equipment, reporting a rarity and a list of rare bird alerts; Vol. 3 has 3 pages entitled "Beyond Bird Identification" (in introduction). *Sequence of species:* new AOU order, species by species. *Species treatment:* usually 5 paragraphs with headings, facing plate. The introductory paragraph (abundance, habitat, nesting, behaviour, etc.) is followed by description (length in inches and cm, usually a range), voice, similar species, range (breeding and winter, occasionally migration). *Special features:* key plumage arrows on miniature, marginal, black and white reproductions of color illustrations. *Price:* $18.50 per volume paperback (can be purchased separately).

In the remainder of this review which is concerned primarily with Prairie Province birds, the 4 guides will be referred to as Peterson, Robbins, NGS (National Geographic Society) and AMGB (Audubon Master Guide to Birding).

Plates

Peterson A review of this guide appeared in the March 1981 *Blue Jay*[7] More extensive reviews have appeared in *Birding* and *Continental Bird Life.*[2],[11] These reviews have also pointed out some errors, e.g., Ferruginous Hawks have feathered legs; the 3rd winter Herring Gull much more closely resembles a 2nd winter bird (Harrison)[9]; the solid black band on the tail of the 2nd winter Laughing Gull should be broken (Harrison) or spotted (NGS) or non-existent (Robbins)! (This plumage is not mentioned in AMGB.) Peterson probably does the best job of putting similar species together.

Robbins The revised volume requires a review within a review. The new edition presents a more attractive appearance than its predecessor. The type face is new, the maps are more brightly coloured and more use is made of regional maps to better illustrate ranges. A check of the first 50 pages of songbirds shows that there are 11 new sonagrams and that many of the old ones are larger and more clearly printed. However, there are still no sonagrams to help separate Willow from Alder Flycatcher. The 1983 version is 20 pages longer than the 1st edition.

Ferruginous Hawk *W. Harris*

A quick comparison shows the new volume to have 130 plates with the same species composition as the 1966 version, 21 plates with one (rarely 2) new species inserted and 20 largely or completely new plates. The additional species are, for the most part, stragglers. Such additions usually reduce the amount of text per species, but the new edition has far fewer wing tips, tails and feet cut off in the plates. However, accuracy and consistency in colour reproduction have been and still are a problem with this publisher. The new edition is much better and many plates are warmer and grayer (as opposed to brown) but this is not consistent from copy to copy. In the books I compared, the plates on pages 43, 125, 136, 137, 339, for instance, of the 1983 version are noticeably more gray-blue, page 215 is grayer and yellower, 321 is yellower, etc., etc.

Robbins' ♀ Northern Harriers are apparently immatures; females are correctly shown in Peterson and NGS but not illustrated in AMGB.

National Geographic The main problem with this book is that not all the good artists are equally good. The Canada geese and goldfinches look like porcelain pieces. There is no dark-phase Ferruginous Hawk. I did not at first identify the Black-and-white Warbler because the bird on the right caught my attention. I found that Harris' and White-crowned sparrows are not quite the shapes of those in my backyard. The flying swallows look awkward to me and the ♂ Brewer's Blackbird head is too blue. A better job could have been done in grouping similar species. It is difficult to understand why sparrows with streaked underparts were separated into 2 groups by those with unstreaked breasts and juncos.

This would have been close to an ideal field guide if arrows had been used to point out diagnostic features. These could still be added from Peterson and AMGB and it would be a valuable learning experience.

NGS illustrates more field-identifiable subspecies than any other guide. Two or more subspecies are shown for 83± species (6 for Fox Sparrow, 5 each for Canada Goose, Horned Lark, Song Sparrow and Rosy Finch), 2 or more colour phases for each of 41± species and 7 hybrids (none for Indigo and Lazuli buntings).

The clarity of detail in these pictures and presentations of so many plumages not only offers more insight into bird variation but also challenges the birdwatcher to look more closely at each bird in the field to determine age, sex, race or colour phase.

Audubon Master Guide According to the preface, "For years the birding community has been waiting for an advanced guide ... For this reason we have tried to prepare the most complete, up-to-date, and useful field identification guide ever devised." As I see it, the format precludes usefulness and the decision in favour of photographs almost assured it would be neither complete nor most useful.

Rigid adherence to the AOU order would seem to largely defeat the purpose of a field guide. It apparently assumes that the observer recognizes every bird seen and needs the guide only for confirmation. How close together are similar species? Five peeps require 12 pages (same page in all other guides); our eagles are 30 pages apart (same page in all other guides); warblers with wingbars begin and end 70 pages apart (16 in NGS); nutcracker and shrike are in different volumes.

The other problem is photographs. The authors and editors of photographic bird guides may plead and proclaim all they wish about the superiority of photos over paintings but they have yet to demonstrate it.[3],[17] Many songbirds in the field are best identified from a side view with a significant portion of the front and underparts visible. However, too many of the passerines in this compendium were photographed from above the horizontal and/or behind, too often not showing shape and extent of throat, breast and belly markings, even though arrows claim these key points are illustrated in some cases, e.g., streaked breast of Sprague's Pipit, "narrow gray breastband" of immature Magnolia Warbler, black throat and upper breast of ♂ House Sparrow.

Other problems with photos include: (1) species presented from angles that are of little use in identification, e.g., Varied Thrush, ♂ Tennessee Warbler, ♂ Orchard Oriole; (2) similar species not photographed from the same angle in the same light, e.g., ♂ Connecticut and Mourning warblers. ♀ Green-winged and Blue-winged teals; contrasting colours of Gray-cheeked and Swainson's thrushes are misleading (in fact, none of the thrush photos depict breast markings as well as the other guides); (3) photos too light and too dark, e.g., Great Blue Heron (too light), Sedge and Marsh wrens on the same page, ♀ Yellow-headed Blackbird (too dark); (4) discrepancy between text and photo, e.g., "checkered black, gray and white upperparts" of breeding adult Greater Yellowlegs vs. brown as illustrated, "yellowish legs" of dark-legged adult Pectoral Sandpiper; (5) conflicts between photos of the same species, e.g., Dusky and Western flycatchers, Sedge Wren, Ovenbird; (6) contrast between photo and painting, e.g., Common Snipe, Marbled Godwit (paintings better); (7) shadows hiding details, e.g., Gray Partridge, adult Lewis' Woodpecker; (8) bills and tails lost in backgrounds, e.g., Trumpeter Swan, Baird's Sandpiper; (9) the juvenile European Starling is too richly coloured and why was an atypical ♀ Wilson's Warbler (with a black cap) shown?

While some photos are redundant, e.g., American Dipper, Brown Thrasher, Vesper Sparrow, there are not enough in other cases, e.g., no dark Snowy Owl, no immature Burrowing Owl or Mountain and Eastern bluebirds.

The artists in AMGB are not as good as those in the other guides (e.g., Field Sparrow photo vs. painting). It is also surprising that a painting had to be used for immature Whooping Crane.

Northern Shrike *Ken Lumbis*

Some photos in the earlier Audubons are better than in the current one, e.g., adult Pectoral Sandpiper, ♂ and ♀ Mourning Warblers[3] (quite different colours in the 2 books), and Northern Rough-winged Swallow, Savannah Sparrow.[17]

Illustrations of birds in flight are, for the most part, marginal drawings. There are no illustrations for ducks flying overhead.

Scale is also lost when each bird fills a frame and is often the only species on a page. When 2 species are on the same page, the scale is sometimes misleading, e.g., Barred Owl is shown as smaller than Burrowing Owl, Northern Flicker is smaller than Black-backed Woodpecker on one page but on the next it is larger than Pileated; Pine Grosbeak is the same size as Purple Finch.

In summary, I do not think this is a very good guide for beginners or "masters" because similar species are not grouped for ready comparison, because too few plumages are illustrated, too many of these are poorly shown and because the text is no better than that in NGS.

Maps

All 4 titles map the ranges of most species. Peterson's maps are about 8 times the scale of the small-postage-stamp maps of the other authors and his ranges are not restricted to eastern North America. For eastern species nesting primarily in the Arctic, breeding ranges are also shown. All guides except AMGB use 4 colours for base maps and ranges. The Audubon guide uses one colour for both base map and distribution with diagonal lines to designate ranges. These fail to do the job for narrow coastal occurrences. This inadequacy is also true of the yellow used by NGS in designating small ranges, e.g., Hudsonian Godwit.

Maps in both Peterson and the NGS guide show provinces and states. The other two do not and are therefore much less useful, although AMGB does devote up to 18 lines of text (usually fewer than 10) to provincial-state distribution. Robbins' maps are the only ones to consistently give information on migration.

A surprising disappointment for a map-oriented society is NGS' depiction of the Canadian Arctic. Victoria and Banks islands are one, as are Melville and Prince Patrick. Somerset and Prince of Wales islands have apparently become part of Boothia Peninsula. These and other deficiencies, e.g., Vancouver Island, are handled adequately in the other guides. Tsk! Tsk!

Probably no 2 guides' maps agree on breeding and wintering ranges. One has only to compare such conspicuous and well-known species as Canada Goose and Mallard to see differences in province and state distributions. However, not one of the 4 titles includes Canada (except for B.C.) in the wintering range of the Merlin. And this in spite of Merlin's appearing in Christmas Bird Counts (CBC) from each of the Prairie Provinces and published in *American Birds* annually since the mid-1970s. In 1976, 26 Merlins were reported on December counts in Alberta, 5 in Saskatchewan and 3 in Manitoba.[10] Edmonton's count of 14 that year was tops among all CBC's in North America.[15]

A partial check showed that some AMGB ranges are better for Canada than NGS', e.g., breeding Northern Mockingbird and winter Blue Jay, Cedar Waxwing and Willow Ptarmigan.

Table of Comparisons

Table 1 makes additional comparisons based primarily on 6 groups of Prairie Province birds. The species

Table 1. PICTURE AND TEXT COMPARISONS

Guide	*Peterson (Revised)*	*Robbins (Revised)*	*National Geographic*	*Master Guide*
Coverage	E. N. Am.	N. Am.	N. Am.	N. Am.
Species Group				
Ducks	31/245	31/223	32/169	32/135
Vultures-Falcons	20/90	21/102	21/109	21/85
Shorebirds	42/176	47/174	47/195	47/168
Gulls	19/83	19/82	19/116	19/82
Warblers	34/101	36/163	36/106	36/89
Sparrows	20/42	22/70	22/79	22/55
Total	166/737	176/814	177/774	177/614
Average	4.4	4.6	4.4	3.5
Usual No. of Species per plate (all species in group)/Words per species:				
Ducks	3-5/89	3-5/58	4/92	1-2/324
Vultures-Falcons	3/109	3-5/74	2-4/132	1-2/423
Shorebirds	3-5/101	5-7/55	4-5/83	1-2/308
Gulls	3-7/99	4-6/75	2-4/140	1/418
Warblers	4-5/81	4-5/67	3-5/92	1-2/325
Sparrows	3-5/87	4-6/72	3-4/115	1-2/337
Pages per group (text and plates):				
Ducks	26	20	28	58
Vultures-Falcons	22	18	26	56
Shorebirds	28	28	38	98
Gulls	10	12	18	42
Warblers	22	28	26	80
Sparrows	12	18	20	48

included in each group were tabulated from 5 sources.[4] [12] [13] [14] [16] The 1st section gives the number of Prairie Province species covered and the number of illustrations of them. Every illustration considered helpful in identification was counted, from whole bird to diagnostic feather to *some* birds in background flocks. The 2nd section gives the number of species *most often* depicted on a plate where species are given major treatment. The words-per-species were calculated by counting lines for the same 10 species in each group, selected systematically (every 2nd or 3rd species in NGS depending on group size), and by counting words in 10 lines that included each of the same 10 species scattered through the guides, i.e., 100 lines were counted.

Section one indicates that Peterson does not include and/or illustrate some Prairie Province species, mainly associated with Cypress Hills and mountains and some stragglers. It also shows that of the 3 other guides, AMGB has the fewest illustrations. NGS has the most for 4 of the 6 groups. Peterson's and Robbins' high number of duck illustrations are largely the result of using 4 paintings to show upper and lower surfaces of males and females in flight, a feat ingeniously accomplished in NGS with just 2 paintings per species — male and female. Robbins' superiority in number of warbler illustrations comes mainly from 2 special pages devoted to warbler heads.

Section 2 indicates another deficiency of AMGB — usually only one species per page or, more often, one picture of one species and 2 of another on the same page, whereas the other guides frequently permit comparison of 3 to 5 species per plate. The 3rd section of the table shows another implication of this arrangement. Note the number of pages that must be searched to find one or more species in a group — 2 to 3 times as many in AMGB.

A related point is that the first 3 guides have written descriptions opposite the entire species. AMGB often does not accomplish this because the adult male in breeding plumage is frequently the 3rd photo for a species and is often on the 2nd page of the species treatment. But the breeding male is the 1st plumage described — on the previous page!

Text

In an attempt to evaluate the text, I selected 10 pairs of species to determine how well the words separated the members of each pair for me. Such a comparison is so subjective that no other birdwatcher is likely to reach the same ratings I did. The pairs were ♀ Blue-winged and Green-winged teals, ♀ Common and Barrow's goldeneyes, immature California and Herring gulls, Cooper's and Sharp-shinned hawks, Greater and Lesser yellowlegs, Semipalmated and Western sandpipers, Least and Alder flycatchers, Loggerhead and Northern shrikes, fall Blackpoll and Bay-breasted warblers, Clay-colored and Brewer's sparrows. For each pair the 4 texts were read and notes made. Then the notes were rated from best (4 points) to poorest (1 point); there were some ties. The totals indicated that NGS was best (35 of a possible 40 points), AMGB next (30 points) with Peterson and Robbins tying with 20 points each (mainly because Peterson does not include Brewer's Sparrow).

With 61 specialists usually permitted a page per Prairie Province species, one would have expected AMGB text to excel over all competition. I don't think it does, as illustrated above and, as another reviewer has written, "in some instances you may search long and hard for those 'master' identification tips that have not been published elsewhere."[1]

In comparing the above species, 3 other problems appeared in AMGB. (1) Under Common Goldeneye, the ♀ Barrow's is described as having a "darker breastband"; under Barrow's Goldeneye, the ♀ Barrow's is said to have a "white chest, breast, and belly." (2) In both Sharpshinned and Cooper's hawks, the "tail is crossed by 4 dark straight bands." The former is drawn this way but the latter has only 3 dark bands. (The number of bands may actually vary.) (3) The descriptions of both Clay-colored and Brewer's sparrows include the terms "cheek patch" and "whisker mark." Neither is labelled in "Parts of a Bird" on p. 15. The same is true for "mantle" used in gull descriptions. However, readers need only turn to p. 10 of NGS to locate them.

Additional evidence of the thoroughness of the NGS guide and the deficiencies of the others may be seen in the number of non-breeding sparrow plumages illustrated. Of the 20 sparrows on the Saskatchewan list, NGS illustrates 16 juveniles, Robbins 7, AMGB 6 and Peterson 4. Immature plumages are given for 5, 7, 6 and 4, respectively, and winter for 5, 1, 0 and 2.

The 4 books were taken to Universal Bindery, Saskatoon, for an appraisal of the binding. All are Smyth-sewn, the same technique used for hardcover books, and all were considered to be equally sturdily bound.

I think it is safe to say that for the Prairie Provinces Peterson and Robbins have now been eclipsed. I also feel that the Audubon Society has given its name to the 3 most disappointing bird identification guides of the last decade.[3],[17] If I were buying only one field guide for myself (or for someone else) or taking only one with me on vacation, it would be Shirley Scott's National Geographic. All four of these guides are available from Blue Jay Bookshop.

Acknowledgements
My thanks to M.D. Gilliland for checking data, commenting on the manuscript and typing early drafts. Thanks also to A.R. Smith and P.S. Taylor, who commented on maps, artists and manuscript. I also much apprecaite the cooperation of Chris Escott, Wayne Harris and Bob Luterbach for contributing their capsule reviews below.

[1] ARBIB, ROBERT. 1983. The Audubon Society master guide to birding. (A review) Am. Birds 37:921-922.

[2] ARMISTEAD, HENRY. 1981. Bird Book wars. The emperor strikes back. Birding 13:117-128 (Includes comments by Peterson)

[3] BULL, JOHN and JOHN FARRAND, Jr. 1977. The Audubon Society field guide to North American birds. Eastern region. Knopf, New York.

[4] CLEVELAND, N.J., C.W. CUTHBERT, G.D. GRIEEF, G.E. HOLLAND, P.A. HORCH, R.W. KNAPTON, R.F. KOES, N.F. MURDOCH, W.P. NEILY, I.A. WARD. 1980. Birder's guide to southeastern Manitoba. Eco Series 1, Man. Naturalists Society, Winnipeg, Man.

[5] DUNN, JON. 1981. A field guide to the birds. (A review) Auk 98:641-644.

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Semipalmated Sandpiper
G.W. Beyersbergen

FIELD GUIDES COMPARISON

Birdwatchers in the field need a book which is simple and concise, but also complete with all species and all significant plumages. Peterson's book was once the birdwatcher's bible, but it covers only the eastern part of the continent and thereby doesn't contain a number of species which occur in Saskatchewan. The range maps are poorly located at the back of the book, and in most cases don't show anything west of central Manitoba. The Robbins *et al* entry is the least expensive of the four. It covers the whole continent and includes a number of vagrants. The maps are coloured and easy to read, and the sonograms are an interesting feature, for those who can read them. Generally, this is an excellent book for the novice birder. The National Geographic guide is much like the Robbins book: full-continent, good maps in colour, checklist in the index. Its coverage of vagrants is considerably more complete, and the number of illustrations of different plumages and forms a bit more extensive than Robbins. Overall it is the best field guide for a birder of any level of experience. The Audubon Society books are not really field guides — they are surely too heavy. The three-volume set gives a well-detailed account of each species which occurs regularly in North America, and accidentals are dealt with in less detail at the back of each volume. The illustrations are mainly photos; these are very good for confirming field marks, but overall visual treatment of forms and plumages is less extensive than the Geographic guide. The Audubon books are a very good alternate reference for avid birders when when considering rare bird sightings, but for the average or novice birder I would recommend the National Geographic guide or the Robbins book.

— *Christopher J. Escott,* 271 Sylvian Way, Saskatoon, Saskatchewan. S7H 5G1

FOUR "NEW" FIELD GUIDES FOR SASKATCHEWAN'S BIRDS

How do the new guides rate for identifying birds in Saskatchewan? All have positive points and unfortunately all have negative points. Peterson unfortunately does not cover all of the species found in Saskatchewan; that is its major drawback. The illustrations are excellent, text excellent, range maps adequate and organization good (similar species on same or nearby pages). Robbins' book has adequate illustrations, poor text, good range maps, and good organization, and it covers all of Saskatchewan's species as do the following two guides. The

National Geographic Guide has good illustrations which cover a greater variety of plumages (i.e. subspecies and varieties), adequate text, adequate maps and good organization. The Audubon Master Guide uses primarily photos for illustrations and many of these are not adequate, the text is excellent, maps good and organization poor.

Which would I take in the field with me? Unfortunately all four and a packhorse! I do not trust any one guide because of inconsistencies between them. If I had to choose one, probably the National Geographic Guide, then Robbins, followed by the Master Guide (in spite of its cumbersome size) and unfortunately Peterson last. I say unfortunately because I prefer the Peterson illustrations and guide organization but do not like getting caught having a guide which may not illustrate what I may see. — *Wayne C. Harris,* Box 414, Raymore, Saskatchewan. S0A 3J0

FIELD GUIDE PREFERENCE

The following is a ranking of three recently released field guides in order of my preference.

My favourite is the National Geographic Society's. This book contains North American species plus an impressive number of stragglers. The degree of coverage of subspecies is an outstanding feature. The thirteen artists portray generally accurate, detailed and richly colored illustrations, however the variance in style is sometimes distracting. Most plates contain examples of both sexes seasonal plumages, immatures, readily identifiable subspecies and flight views. Group plates provide direct comparisons with similar species. The flying ducks are my favourite. The side view allows one to see the birds as they appear "flying by", with the underside and the top of the wing shown in one figure. (This is in contract to the Golden Guide's gliding or banking bird, requiring two illustrations.) A major weakness is the lack of diagnostic arrows as quick visual reference for identification. Maps show state and provincial boundaries and the text, though brief contains much information.

My second choice is the revised, expanded Golden Guide (Robbins, et al), now containing illustrations and written references for Alaskan and Florida stragglers in addition to North American residents including many subspecies. Some of the new plates are disappointing (i.e. the Alaskan peeps are not clearly illustrated or properly coloured). Several revised pages now seem crowded. Some stragglers are only illustrated in male nuptial plumage. The original plates are excellent but again this book does not feature diagnostic arrows. There are more voice sonograms, excellent range maps with migration routes and brief commentaries.

The Audubon Society's three volume set has a fundamental problem. Too many of the photos do not show critical diagnostic features although this guide does feature margin miniatures with diagnostic arrows. Fewer stragglers and subspecies are included. There are very few flight views. The small range maps do not show boundaries. Species information is provided by various regional and national experts. The text is better than the others, but the book is an expensive, limited reference source, with several reviews containing the same criticisms. — *Bob Luterbach,* 3040 18th Avenue, Regina, Saskatchewan. S4T 1W6

ADDER'S-MOUTH ORCHIDS IN SASKATCHEWAN

VERNON L. HARMS, The W.P. Fraser Herbarium, and Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan. S7N 0W0

In a recent Blue Jay article, Bernard de Vries, while commenting on Donald Hooper's earlier account of finding White Adder's-mount [*Malaxis monophyllos* (L.) Swartz var. *brachypoda* (Gray) Morris & Eames] along the Fir River Road in the Pasquia Hills, stated that this "... brought to mind a similar ... find in 1972 when ... (he had discovered this same orchid) in a small willow bog at Little Boggy Creek near Runneymede".[6] [13] de Vries added that "this collection precedes the earliest reference given for this orchid in Saskatchewan by two years", citing as a reference for this statement the *Syllogeus* booklet on the rare plants of Saskatchewan.[17] Actually the finding of White Adder's-mouth in the province predates this considerably, but there are understandable reasons for at least some possible confusion with regard to the historical story of adder's-mouth discoveries in Saskatchewan. Unfortunately contributing to this somewhat muddled state, were some early misidentifications and resulting erroneous reports (e.g. 7 & 8, 3 & 4), general provincial reports lacking locality citations (e.g. 10 & 1), sometimes incomplete literature referencing (e.g. 3, 17 & 6), and the dispersion of voucher specimens among various, sometimes small or private herbaria.

The present paper has a two-fold objective. First, it is intended to correct potential misconceptions with regard to the history of adder's-mouth discoveries in Saskatchewan, giving credit to the earlier collectors in the province. Secondly, it is intended to summarize current knowledge of habitats and distributions in Saskatchewan of adder's-mouth (*Malaxis*) species, our smallest, most delicate, least conspicuous, and perhaps rarest orchids.

The herbaria serving as repositories for the voucher specimens that document the locality records, are indicated below by the acronyms ascribed to them in the internationally accepted *Index Herbariorum* (plus several additional ones in quotes) as follows: CAN (National Museum of Natural Sciences, Ottawa), DAO (Department of Agriculture, Ottawa), FQH (Fort Qu'Appelle Herbarium, B. de Vries), "JHH" (John H. Hudson Herbarium, Saskatoon), "RCR" (R.C. Russell Herbarium, Canada Agriculture Research Station, Saskatchewan), SASK (The W.P. Fraser Herbarium, University of Saskatchewan, Saskatoon), and USAS (University of Regina Herbarium).

Our native adder's-mouth species are rather small green orchids, mostly less than 2 dm (8") tall, arising from solid corms, with the leaves either solitary or several and then alternate, usually sub-basal. The flowers are yellowish- or whitish-green, small or relatively inconspicuous, 6 mm (1/4") broad or less, born several to many in slender spike-like racemes. The unspurred lip-petals and other perianth parts are mostly less than 3 mm (1/8") long (often only about one-half of these sizes). The two known Saskatchewan species — the White and Bog Adder's-mouth — plus the still unverified Green Adder's-mouth, can be distinguished from each other by means of the characters in the following identification key:

1a. Leaves 2 (-4) sub-basal but alternate, ovate-lanceolate to oblanceolate, only 1-3 cm long; tubers usually 2 in vertical tandem, the new tubers forming in axils of the sheathing leaves; flowers minute, less than 3 mm broad; lip-petal uppermost (inverted from that of typical orchid flowers), only 1.5 mm long, ovate with acute or somewhat acuminate apex, dark-green-nerved; sepals 2-2.5 mm long, distinctly longer than the lip and lateral petals; scapes and spike-like racemes very slender and lax, the flowering racemes less than 5 mm thick — *Malaxis paludosa* (Bog Adder's-mouth)

1b. Leaf solitary, broad-elliptic to oblong, 3-6 (-8) cm long; flowers larger, 3-6 mm broad; lip-petal lowermost, 2-4 mm long, more or less cordate with basal auricles, lacking dark-green veins; sepals and petals subequal in length, 2-3 mm long; flowering racemes over 5 mm thick —(2)

2a. Leaf attached near base of scape (flowering stem); lip-petal triangular, abruptly narrowed to a long-tapering point, drooping or reflexed; flower-stalks shorter than the flowers, only 1-2 mm long; flowering racemes less than 1 cm thick — *Malaxis monophyllos* var. *brachypoda* (White Adder's-mouth).

2b. Leaf inserted near middle of scape; lip-petal deeply cleft nearly halfway to base with a small tooth in the notch, somewhat ascending or upturned; flower-stalks longer than the flowers, to 8 mm long; flowering racemes over 1 cm thick — *Malaxis unifolia* (Green Adder's-mouth)

The first Saskatchewan collection of White Adder's-mouth (*Malaxis monophyllos* var. *brachypoda*) appears to have been by Dr. W.P. Fraser, 6 July 1934, from Lake Waskesiu (in SASK & RCR). Unfortunately he originally misidentified this collection as Green Adder's-mouth (*Malaxis unifolia* Michx.) and the Lake Waskesiu locality reported under the latter name in Editions 1 and 2 of the Fraser and Russell Saskatchewan plant lists[8],[9]. The name was corrected to *M. brachypoda* (Gray) Fern. in the Edition 3 revision, but this edition omitted all locality citations[10]. August Breitung, listed this taxon as *M. monophyllos* var. *brachypoda,* (as it is usually treated today), and reported it only from Lake Waskesiu[4]. Rather surprisingly, a decade later, Voivin still questioned the Saskatchewan occurrence of this species, apparently considering that the earlier reports by Fraser and Russell and Breitung needed verification.[1] [10] [4] Boivin's own annotation label dated the same year (1967), however, appears on the SASK specimen of W.P. Fraser's Lake Waskesiu collection.

The second Saskatchewan locality to be recorded for White Adder's-mouth was from 5-7 miles south of Macdowall (about 25 miles southwest of Prince Albert), where it apparently was first collected 12 August 1946 by Dr. R.C. Russell, Canada Agriculture Research Station, Saskatoon in association with Ottawa-based colleagues, H.A. Senn and H. Groh, (2937, in DAO, SASK & RCR). Two early collections are present in herbaria with locality designations given only as "Prince Albert": one by O.C. Furniss on 17 July 1949 in "muskeg", (S2999(a), in SASK, DAO, & RCR), and the other by George F. Ledingham on 29 July 1950 in "wet

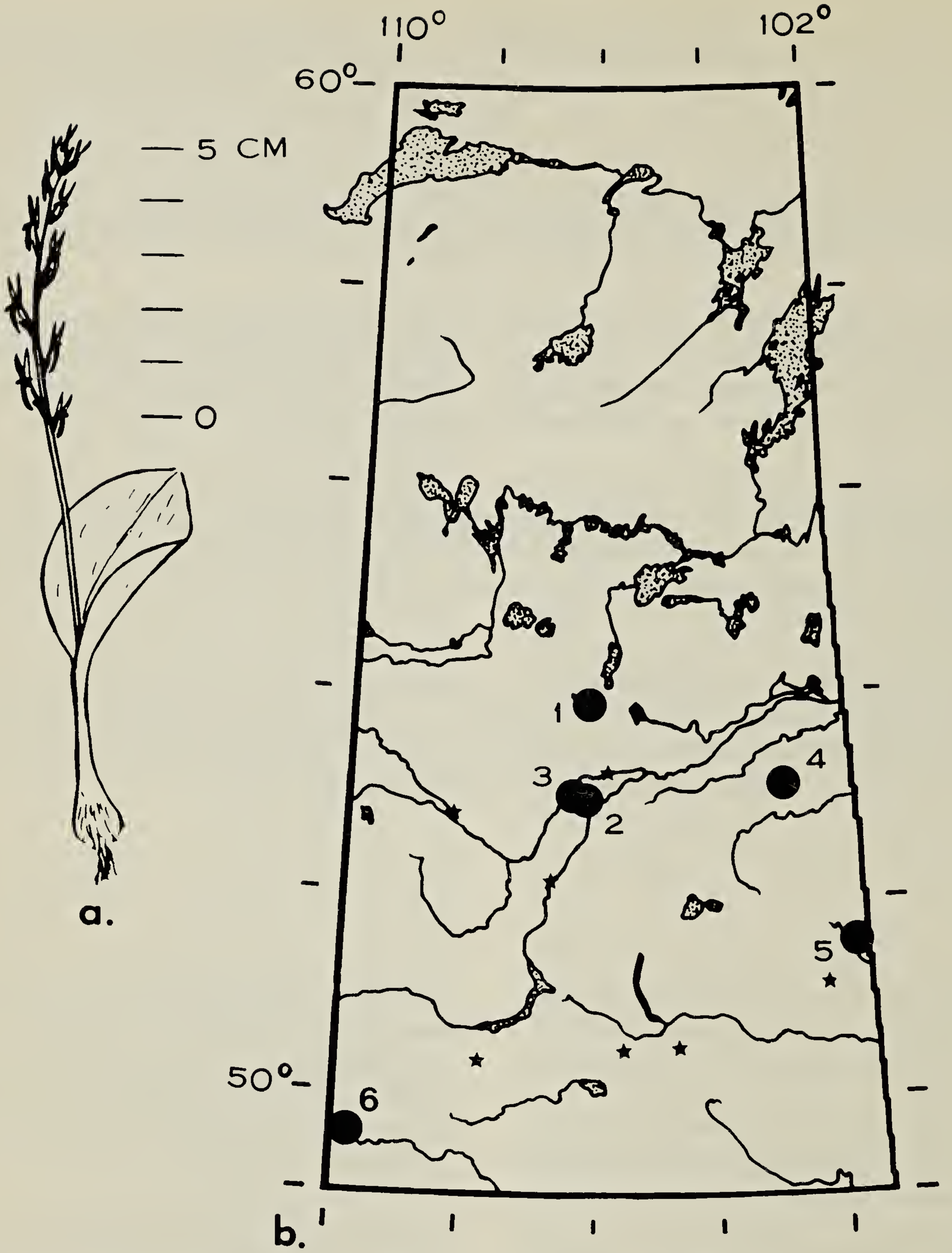

Figure 1. The *White Adder's-mouth* a) *Plant habit sketch* b) *Map of known Saskatchewan distribution.*

spruce woods" (975, in USAS). Apparently both are still attributable to the previous Macdowall site (in the general Prince Alberta district), and do not represent a separate "Prince Albert" locality as was implied by the text and map in Maher, *et al.*[17] Subsequent collections from the Macdowall locality (all within a 2-mile radius) were made by George F. Ledingham and John H. Hudson 12 July 1952 "from boggy mossy spruce woods, in only the shadiest places" (1020 & 1487, in SASK, USAS, JHH, etc.), and by John and Heather Hudson 2 August 1981 from a "moist peaty *Carex* sward ... at edge of marsh" (4171, in SASK, JHH, etc.). John Hudson also collected this orchid from near Garthland, about 16 miles northwest of the Macdowall station, 14 September 1974 from "wet black spruce woods" (3040, in SASK & JHH).[14 15] Although all locality citations were omitted in Edition 3 of the Fraser and Russell provincial plant list, the Macdowall locality ws quite obviously known to the revisors, since two of them, R.C. Russell and G.F. Ledingham, had already collected it from there, and as revealed by the fact that soil zones 3 and 4, as well as 5, were indicated for the species.[10]

The fourth and fifth Saskatchewan localities (actually third and fourth general localities because of the proximity of the Macdowall and Garthland sites) to be recorded for White Adder's-mouth were the previously mentioned significant finds by Bernard de Vries 26 June 1972 from Little Boggy Creek northeast of Runnymede (4466.72, in FQH), and by Donald Hooper 9 August 1982 from the edge of a spring-pond in the Fir River Valley of the Pasquia Hills in SASK)[5 6 13]

Recently a sixth and very significant Saskatchewan locality has been added for this orchid, based on a collection by George F. Ledingham and Gwen J. Jones, 20 July 1983, from the Cypress Hills west block, west of the University of Regina Field Station, growing in "white spruce wet woods ... (on) north-facing slopes near seepage areas" (8084, in USAS & SASK).

From the specimen label data, the habitat of the White Adder's-mouth Orchid in Saskatchewan would appear to be moist to wet black spruce-larch boggy woods and treed bogs, or wet peaty sedge-fens. See figure 1 for a habit sketch and map of the verified Saskatchewan distribution of this species.

Bog Adder's-mouth, *Malaxis paludosa* (L.) Swartz, appears even rarer in Saskatchewan than the previous species. It has been infrequently encountered and collected, and is scarcer wherever coexistent. August J. Breitung apparently made the first Saskatchewan collection of this species 30 July 1939 from a "sphagnum swamp" seven miles east of McKague (314, in DAO). The specimen label bears the added rarity notation "only 1 plant found there". Unfortunately, the specimen was misidentified as Northern Bog Twayblade (*Liparis loeselii* (L.) Rich.), so Bog Adder's-mouth was never included in either of his catalogues.[3 4] Boivin, who in 1965 had correctly annotated Breitung's specimen from the McKague area, included Saskatchewan within the range he gave for Bog Adder's-mouth, although without locality information, presumably on the basis of this collection.[1] The first Saskatchewan report of this species with locality information was by Hudson, based upon his 1976 collection from near Garthland 14 September 1974 in "wet springy black spruce woods", represented by a single plant intermixed with a collection of White Adder's-mouth (3039, JHH).[14] Similarly, in 1978, I determined and annotated as Bog Adder's-mouth a single plant on a sheet of White Adder's-mouth collected from "moist black spruce woods" 7 mi. south of Macdowall (Ledingham & Hudson, 1487, USAS). The latter was the basis of the Macdowall record in the *Syllogeus* list of Saskatchewan rare plants.[17]

Subsequently, Bernard de Vries has reported two significant records of Bog Adder's-mouth, one collected 26 June 1974 from a bog "in coniferous woods" at Nipawin (de Vries, 3027.74, FQH)[5], and the other 27 June 1982 from the "gravelly shores of Madge Lake among young spruce" in Duck Mountain Provincial Park (de Vries, 7315.82,FQH).[5 6]

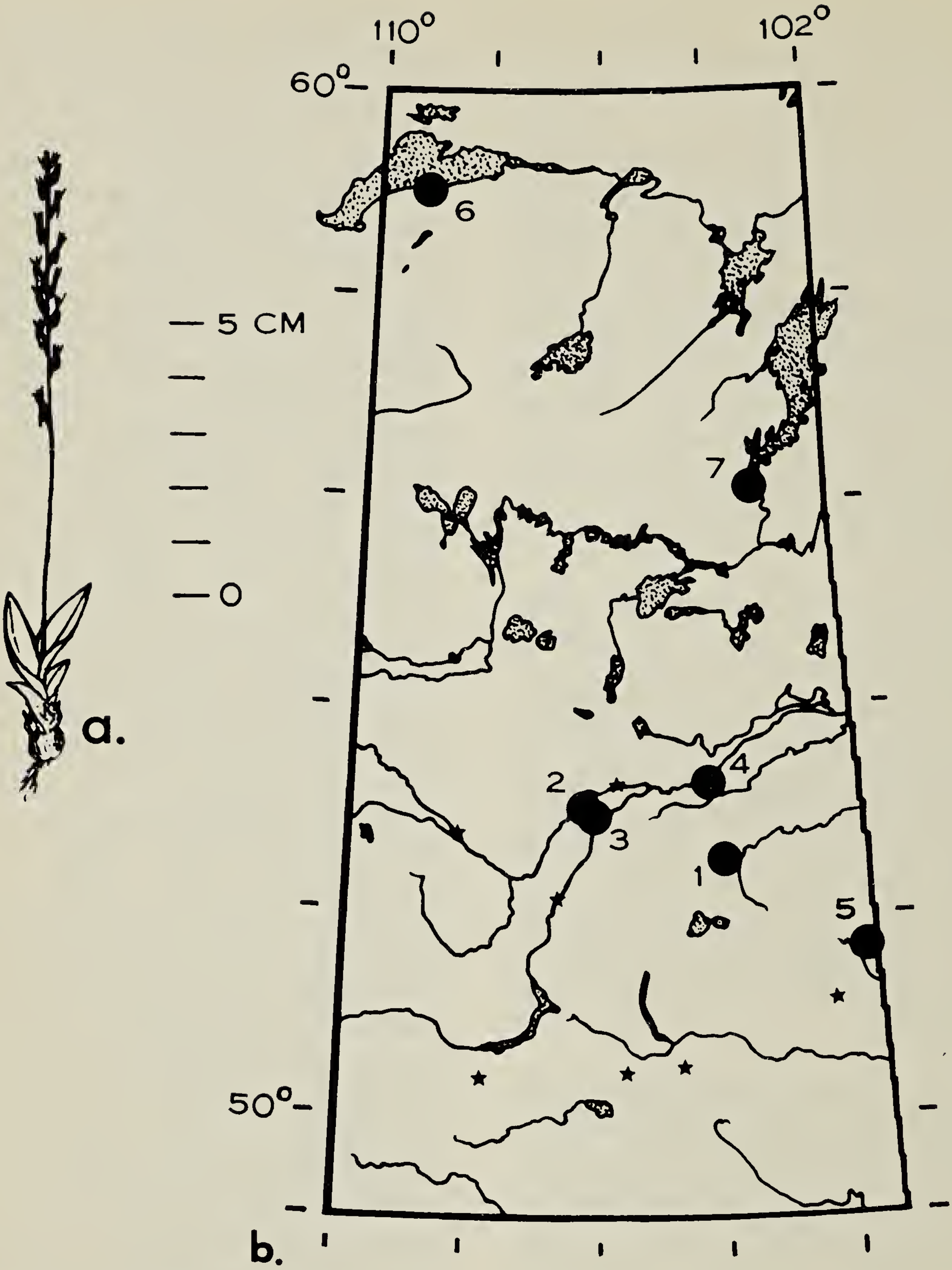

Figure 2. The *Bog Adder's-mouth* a) *Plant habit sketch* b) *Map of known Saskatchewan distribution.*

Two other reports of Bog Adder's-mouth from northern Saskatchewan represent significant records for the province. The first is a collection 6 July 1979 from Cantara Bay (about 5 km southeast of Beaver Point) on the south shore of Lake Athabasca, in moist springy woods (Harms, Hudson & Wright, 24970, SASK).[12] The second is a collection by John Hudson 6 August 1982 from a floating bog at the mouth of Little Deer River near Southend (JHH, 4258, SASK, USAS & JHH).[16] Interestingly, the latter appears to be the only Saskatchewan locality where individuals of this species, while hardly frequent, at least were not extremely scarce. John Hudson (pers. comm.) also reports a sight record (uncollected) of one plant from a large bog along Hwy. 105, about 20 km west of Southend, 13 km north of the junction with Hwy. 102.

From the available specimen label information, the habitat in Saskatchewan of Bog Adder's-mouth appears similar to that of White Adder's-mouth — viz. moist black spruce woods, bogs, sedgefen borders, and moist wooded or semi-wooded shores. It appears to have a more northerly range in the province. See figure 2 for a habit sketch and map of the verified Saskatchewan distribution of this species.

Although early Saskatchewan reports are unverified, a third species, the true Green Adder's-mouth, *M. unifolia* Michx., could possibly be discovered in this province.[7] [8] [9] If Scoggan's locality report is correct of this species from near the Saskatchewan River mouth north of Lake Winnipegosis, Manitoba (reportedly based upon a collection by John Macoun in CAN), it should be looked for in nearby east-central Saskatchewan.[18] In the *Syllogeus* list of Manitoba rare plants White and Johnson, however, omitted the latter locality for the species; their compilation shows this orchid still unverified west of the Sandilands Forest Reserve in southeastern Manitoba, and thus very unlikely for Saskatchewan.[19] Boivin, (by his parenthetical inclusion) implied that all Manitoba reports of Green Adder's-mouth need vertification, or at least that he had not seen any from that province.[2]

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[17]MAHER, R.V., G.W. ARGUS, V.L. HARMS, and J.H. HUDSON. 1979. The Rare Vascular Plants of Saskatchewan. Syllogeus No. 20, National Museum of Natural Sciences. Ottawa, Ontario. 55 pp. + maps (p. 33).

[18]SCOGGAN, H.J. 1978. Flora of Canada, Park 2. Pteridophyta, Gymnospermae, Monocotyledoneae. National Museums of Canada, Ottawa. 1711 pp. (p. 542).

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A SECOND EVENING STAR IN SASKATCHEWAN

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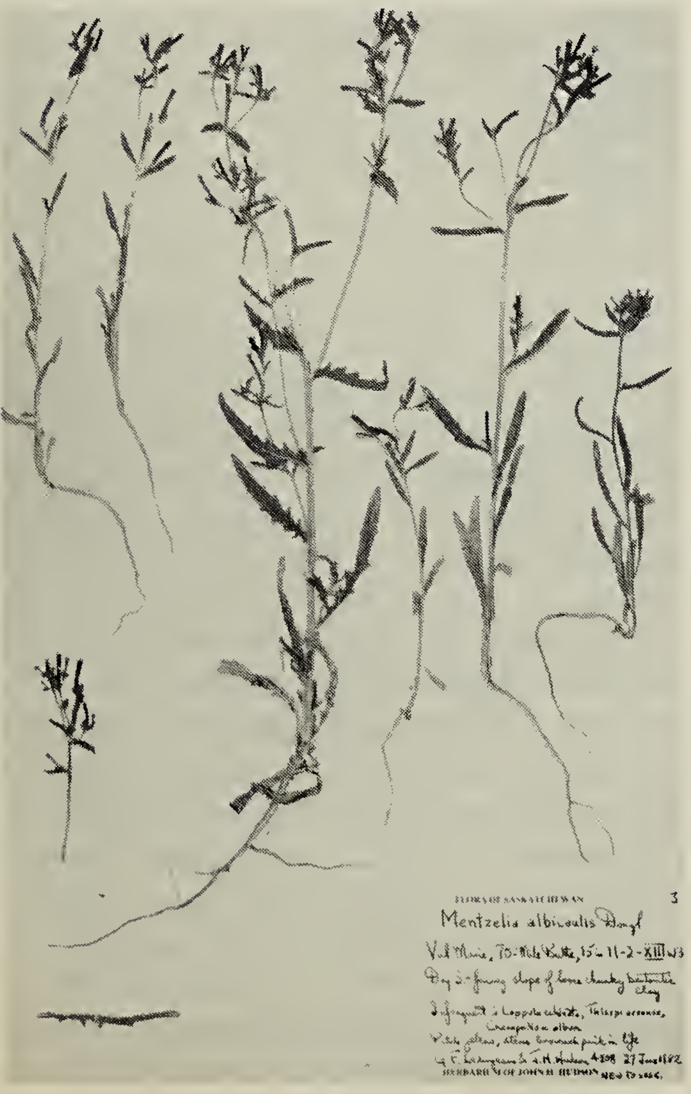
S7N 1A9

In June 1982 I had the opportunity to go along on a field trip to Val Marie set up as a post-convention tour by the Canadian Botanical Association. One of the stops was 70-Mile Butte, on the north side of the Frenchman, some five miles down-river from Val Marie (but of course longer by trail). The group was wandering over a steep south-facing slope of bentonitic clay when George Ledingham and Gordon Thomas from the Regina Research Station came up to me with a plant for identification. While I was puzzling over it, for I had never seen it before, I was told by George that Mr. Thomas had offered to bet him $25.00 that I didn't know it, and George had a good mind to take him up on this bet. I said, "You would have lost, for I don't know it — never saw it before. However, I'd tentatively guess *Loasaceae,* because of the extreme roughness of the leaves".

You may be sure I, too, collected some material and when I got home it proved to be a *Mentzelia albicaulis* Dougl., known in Canada hitherto only in the dry interior of British Columbia. Collection data are as follows: "Hudson 4208, Val Marie, Seventy-Mile Butte, LSD 15 in 11-3-XIII W. 3rd. Dry south-facing annual-inhabited coulee slope, soil loose chunky bentonitic clay, lying at angle of repose".

The general appearance of the plant is not a bit like its larger relative

Evening Star (*M. decapetala*); instead of 10 white petals 5 or 10 cm long, its flowers have 5 yellow petals something like 5 mm long. It is an annual about the size and strict build of Tarweed (*Madia glomerata*) or the smaller Willow-herbs. The oblong to linear leaves are serrate to pinnatifid below, subentire above. The flowers must be night-blooming, for they were not open in the light of morning when first we saw it. The pods are reasonably obvious, some 2 cm long and 3-4 mm diameter, green, ribbed and plainly tipped by the remains of the flower. About the only good field mark would be the extreme roughness of the leaves from hooked hairs — they feel like so much emery paper. The plant seems to have no English name given in floras; one might translate the Latin name as White-stemmed Evening Star. The stems are reported to grow conspicuously white in age, although they were flesh pink in this material.



Apart from this record, 1982 and 1983 did not give me much in the line of surprises. In both summers we spent a fortnight with a daughter and son-in-law at their lodge near Southend on Reindeer Lake. I collected a fair number of plants I hadn't seen before, but to list them in full here would be a rehash of the Heilman-Ternier collections listed in Rhodora 82 (830), 239-280, (1980). Perhaps worth mentioning are #4258, Bog Adder's-mouth (*Malaxis paludosa* (L) Sw) from a floating bog at the mouth of the Little Deer R., 56° 20½"N, 103° 18'W; and #4291, Alaskan Club-moss (*Lycopodium sabinaefolium* Willd. var *sitchense* (Rupr.) Fern.) from a stunted pine wood on lichen-covered sandy soil, 56° 16'N, 103° 33'W. I should add a sight record at a second locality for Bog Adder's-mouth at a bog some 12 mi. W. of #4258, at 56° 22'N, 103° 34½' W.

In more southern parts of Saskatchewan, the only collection of mine worth noting, and that only as a range extension, was #4311, Meadow Sedge (*Carex granularis* Muhl.), from the upper calcareous margin of a groundwater seep, on the river, northeast of Rosthern, at a location which could be called S. edge S.E.¼ 7-43-I W.3rd if the land were not laid out in the old river lots.

EDITOR'S NOTE: In Britton and Brown, An Illustrated Flora of the Northern United States and Canada, the common name given is White-stemmed Mentzelia.

DIAPAUSE IN THE BEET WEBWORM

L. G. PUTNAM, 35 Kirk Crescent, Saskatoon, Saskatchewan. S7H 3B1

A leaf-eating insect species that lives all year in Saskatchewan must not only be able to avoid freezing to death, but must avoid hatching or otherwise emerging into an environment in which the food supply is deteriorating and the cold temperatures of winter rapidly approaching. The physiological state that preserves such a species in a state of arrested development through the winter, so that it can resume its life processes when the environment is improving, not worsening, is called diapause. This condition corresponds to dormancy in plants. Some period of experience at winter temperatures is required to "break diapause" and permit the resumption of development. For example, in one of our pest grasshoppers, the Clear-winged Grasshopper (*Camnula pellucida* Scud.), diapause intervenes when the embryo in the egg has undergone about half its progress toward readiness to hatch. No matter how much warm weather the egg experiences in the late summer and fall, nothing happens beyond the halfway stage until spring. In the Bertha Armyworm, diapause occurs in the pupal stage; the pupa, formed in the fall, remains secure in the soil until spring. In other species, diapause may occur in a larval stage, in nymphs, or even in adults that winter over; in the latter case, a reproductive diapause may occur in a larval stage, in nymphs, or even in adults that winter over; in the latter case, a reproductive diapause delays sexual maturity until spring. Our pest fleabeetles are an example of the latter kind.

In this article, I wish to enlarge a little on the diapause situation in the Beet Webworm, *Loxostege sticticalis* L. (Lepidoptera: Family Pyralidae). In the past, this species has been a pest, its marching habit resulting in invasions of broadleaved horticultural and field crops. For its food supply, especially at the "nursing" stage, this species favours plant species of the goose-foot family (Chenopodiaceae), notably Sugar Beets, Lambs' Quarters and, surprisingly, Russian Thistle. Completing its larval growth, the Beet Webworm burrows into the soil and spins a cocoon about 3 cm long. When the caterpillars have been abundant, it is easy to sift these cocoons out of soft earth or sandy ridges along the edges of fields containing suitable food plants. The larva within the cocoon may soon enter the pupal stage, followed by the adult moth without interruption, or, it may remain in the larval or "prepupal" stage until the following spring. Thus the species is potentially capable of two things: producing more than one generation in one growing season, and saving enough over winter to get the population going the following year. Two generations a year have been claimed for Montana, and more for the warmer parts of Asiatic Soviet Union. I wish to elaborate on this "facultative diapause" situation.

It turns out that the beet webworm is an example of those species in which the occurrence of diapause is determined by day length (hours of light/day) and temperature experienced by the insect during its larval stage. Logically enough, short day length and cool temperatures, indicative of approaching winter, tend to put the spun-up caterpillar in diapause, and the opposite conditions tend to reduce or entirely avert it. Danilevskii compiled the information on day length and diapause in numerous species in a book published in 1965.[1] Some data from experiements performed by myself show how temperature and photoperiod interact to affect diapause in the beet webworm.

No beet webworm caterpillars reared under 17 hours of light per day entered diapause after rearing at any constant temperature from 19 to 27° C. At 15.5 hr, only 5 to 20% did so at any of those temperatures. We were normally able to keep a culture going generation after generation in the greenhouse without interruption due to diapause with a day length of 16 hr, given any temperature favourable for insect and food plant development, 'round the clock. At 14 hr light per day, response to controlled rearing temperatures became quite sensitive. At an approximately constant temperature of 19-20° C, nearly 100% entered diapause at 14 hr, but at 25-26°, only 45% did. At the very warm constant temperature of 35°, only 20% diapaused even at the brief day length of 12 hr. Thus what is for us an unrealistically high temperature can negate the expected effects of short day length.

Constant temperatures applied to caterpillars feeding actively on foliage in the rearing chamber are of course unrepresentative of what occurs in the field, where it is often difficult to be sure of what the thermal experience of an insect is. In the laboratory, we were able to impose fluctuating temperature regimes with a daily range of 9 to 20° C, and of 10 to 26°. With a photoperiod about typical of June to early August at latitude 52° N, the response was quite sensitive to these different programs: high percentage diapause to the cooler one, and low from the warmer. There would thus seem to be a possibility for differing diapause response under natural conditions, depending on the thermal experience of a larval brood, whether at different times of the same year, or at the same times in different years. For example, if the main larval brood occurred late in summer, or if there were two broods, one early and one late, the late broods might respond differently from the earlier one.

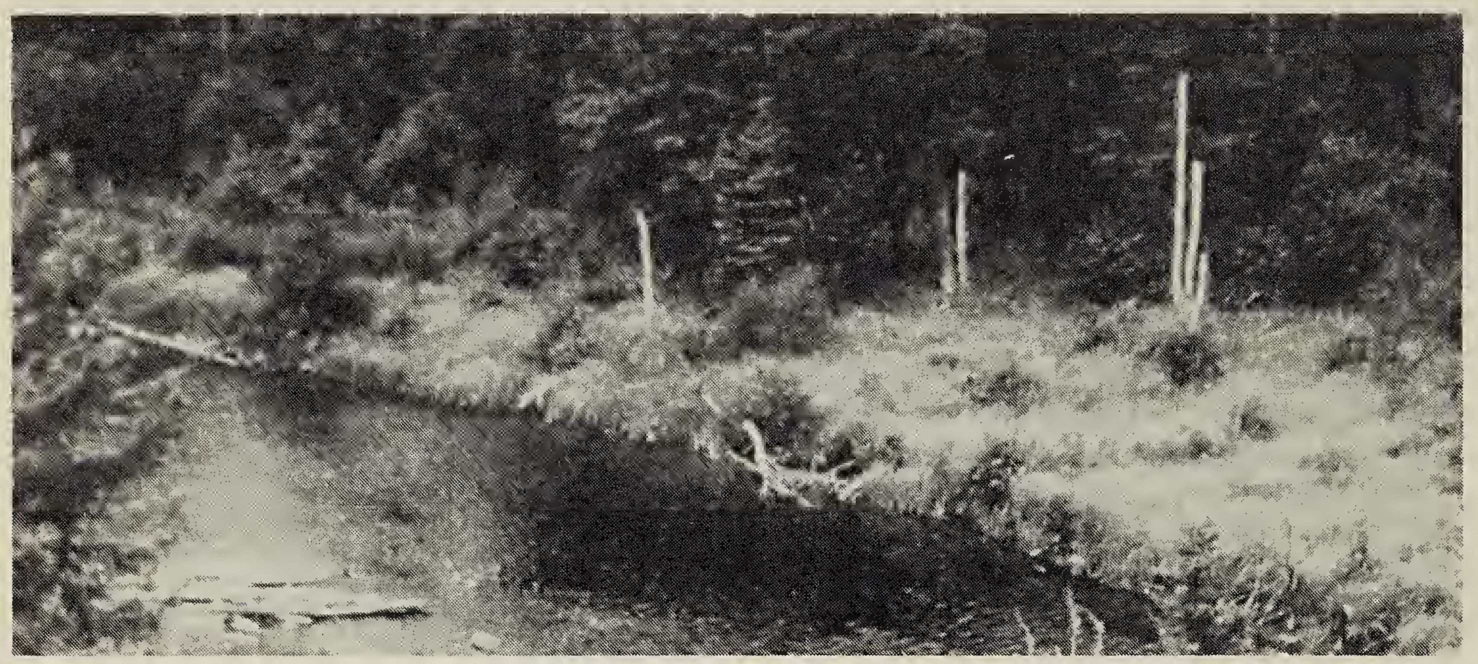
In a field cage experiment performed in 1969, larvae developing from 3 June to 15 July (photographed about 16.5 hr), diapause incidence was about 38%; from 4 July to 7 August (photoperiod declining from 16.5 to 15.1 hr), 53%; and from 12 August to 7 September (photoperiod declining from 14.8 to 13.25 hr), 98%. The temperatures were those occurring naturally: the average daily mean temperature at Saskatoon for the first period was 14.5° C, about 1.8° below normal; for the second, 17.6, also about 1.8° below normal; and for the third, 17.6°, about 1.2° above normal. Photoperiod seems to contribute more to understanding the results than temperatures in this case.

During these investigations, only three collections of maturing larvae were taken from the field to determine diapause on final rearing in the laboratory. All were collected early in August of different years, having completed most of their development in July. In each, 60 to 65% of the larvae entered diapause in the cocoons.

Both the field cage work and the samples from field infestations were too limited to encompass all the possibilities, but the indications are that under most conditions in the field, at times under which a larval brood is likely to develop, half or more would enter diapause. Any that did not do so, and that emerged as moths in August or later the same year, would produce progeny that would have a doubtful future. It remains to be seen whether some conditions in the field would be extreme enough to result in negligible diapause, with a corresponding failure of the overwintering population attended by a crash next year, or conversely, whether an unusually high percentage might enter diapause, with a heavy moth flight the following year.

The experiments reported here were performed while the author was employed at the Canada Agriculture Research Station, 107 Science Crescent, Saskatoon, Saskatchewan. S7N 0X2, using the Station's laboratory and greenhouse facilities.

[1] *DANILEVSKII, A.S. 1965. Photoperiodism and seasonal development of insects. Oliver and Boyd. 283 pp ix.*



MacLennan River, Prince Albert National Park — Blake Maybank

OF ICE WORMS AND SNOW FLEAS

ALAN R. SMITH and A. LINDA LAHEY, 614 Lansdowne Avenue, Saskatoon.
S7N 1E3

On 13 March 1983, a warm spring-like day in northern Saskatchewan, we were walking down the trail to Trappers Lake in Prince Albert National Park when we noticed that the snow was covered with what appeared to be soot. A closer examination revealed the prescence of millions of tiny insects. At that time the only thing we knew about them was that they were called "snow fleas".

The thought that cold-blooded animals of any kind can tolerate or even thrive in the snow is bound to cause scepticism. But "ice worms" and "snow fleas" do exist. Ice worms are oligochaete worms that actually live and breed in the snow of glaciers. Snow fleas are members of the insect order Collembola which are familiarly known as springtails. The most commonly-occurring snow flea is *Achorutes nivicolis* (Fitch); it is this species that we believe we saw at Trappers Lake on this day and two weeks later on 27 March.

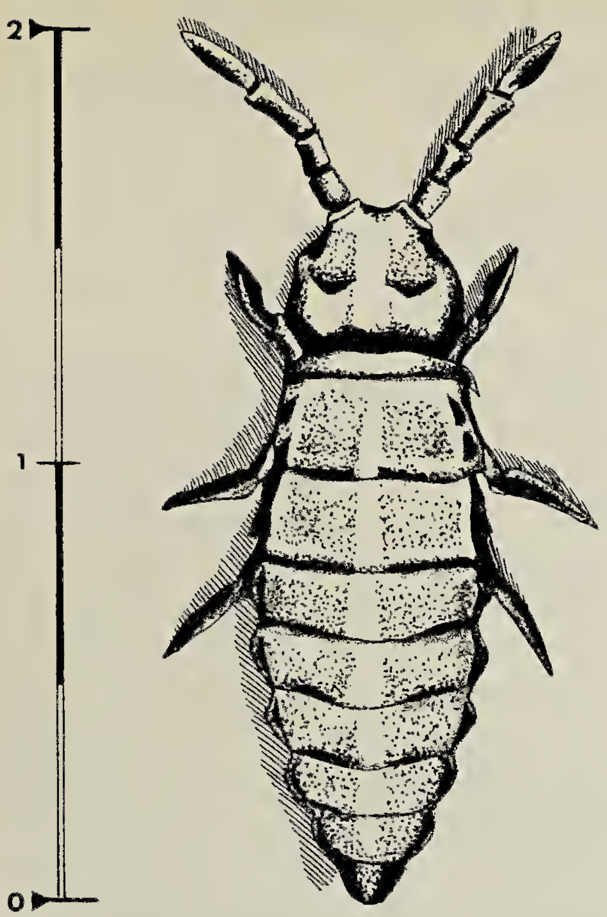


Figure 1: *Adult snow flea. Scale in mm.*

Snow fleas are primitive insects; they are wingless and have incomplete metamorphosis (that is they hatch out as miniature adults). The body consists of nine segments, the first three of which possess legs (see Figure 1). The most striking feature, and the one to which the springtails owe their name, is the leaping apparatus. This is attached to the underside of the seventh segment and is known as the furcula. While at rest the furcula is bent forward under the body and held under tension by the double-fingered appendage on the sixth segment known as the tenaculum. If the tenaculum is relaxed the muscle at the base of the furcula pulls strongly downwards and hurls the insect as much as 15 cm (6 inc.) into the air. While aloft the furcula is folded back into position in preparation for the next jump. Leaping, however, is generally only used to escape danger as the usual mode of locomotion is walking.

Little is known about the life history of snow fleas. The eggs are about 0.10 mm in diameter and are laid in masses of 50 to 100. The young at hatching are white but grow darker with age. Snow fleas are sexually mature at a length of 1.25 mm and attain a maximum length of 2.00 mm. The main food appears to be organic detritus which is gleaned from their forest floor habitat. When food supplies become exhausted the species begins to swarm. Although this phenomenon can occur any time surface temperatures are at or above freezing, swarming is only noticeable to the casual observer when there is snow cover. At this time the minute insects climb up through the interstices of snow crystals or along plant stems to accumulate on the surface of the snow where their tiny black bodies contrast with the whiteness of the snow.

We noticed snow fleas in only one location: in a strip 5 x 100 m along the trail to the lake. The winding trail runs through heavy mixed woods so perhaps the swarming occurred on the only stretch of the trail where trees did not block the sun's warming rays. The sight was remarkable: tiny black bodies were leaping everywhere. They were particularly abundant in ski tracks and footprints. One ski track contained snow fleas several millimetres thick!

For those interested in learning more about springtails in general and snow fleas in particular, we refer you to an article by Charles MacNamara which appeared in the *Canadian Entomologist* in 1919[1]. The descriptions of snow flea anatomy and life history presented in this paper are mere summaries of the many interesting facts found in MacNamara's article.

[1] MacNAMARA, CHARLES. 1919. Popular and Practical Entomology — Remarks on Collembola. The Canadian Entomologist, LI(4):72-80; (11):240-245; (12):265-271.

42nd ANNUAL SASKATCHEWAN CHRISTMAS BIRD COUNT — 1983

Compiled by MARY I. HOUSTON, 863 University Drive, Saskatoon,
Saskatchewan. S7N 0J8

The intrepid group of bird counters which has descended upon Fort Walsh regardless of weather, each year since 1976, was on hand again this year, braving -30°C to -20°C temperatures with winds up to 60 km/hr. To top it off, they counted the highest number of species for Saskatchewan, with 36 species seen on count day and 4 additional species seen during count period, but not on count day. The second highest count was taken at Big Gully Creek, where 30 species were seen on count day with 4 additionals during the count period. Fort Walsh counters also turned up the only new species for the all time Saskatchewan Christmas Bird Count list — a Belted Kingfisher. This brings the all time total of count day species to 137 plus 2 races and 2 additionals.

Counters reported from 62 localities — a good number despite the severe weather before Christmas and the freezing rain at New Year's. Sixty-six species on count day with 4 additionals during count period is less than usual, perhaps because of the spells of poor weather.

No Great Gray Owls or Pine Siskins were reported this year. Bohemian Waxwings made a comeback, and there were fewer Cedar Waxwings — last year's increase in numbers and range has not continued. There was a marked increase in the number of localities reporting Merlins — 14 in 62 counts in 1983 as compared to 8 in 63 counts in 1982. Probably the most striking increase was in the number and range of Rosy Finches. First reported in 1945 and 1946 at Dollard, they were not reported again until 1975 when 1 was seen at Spring Valley. At Fort Walsh in 1976, 140 were seen; in 1977, 23; in 1978, 1, in 1979, 22. At Eastend 65 were seen in 1980. In 1981 and 1982 Rosy Finches were not reported in any count. This year, however, they were reported from 5 different areas: Biggar (1), Fort Walsh (488), Govenlock (3), Swift Current (25), and White Bear (25).

After the list of participants from the 62 localities, and the map, Table 1 gives the Coverage and the Weather; Table 2 gives species reported in more than 3 locations and gives numbers of each species seen in each locality on count day, with numbers for additional species during count period indicated with a + sign; Table 3 gives numbers and locations of species seen in 3 or fewer locations during count period. Table 4 gives locations and numbers of birds not positively identified as to species.

Count Areas and Participants

Names of compilers in italics.

1. ASSINIBOIA. Ed. Bearss, Elaine Brunt, Jack Burgeson, *Cec Hayward,* Don Lemond, Ted McMorrine, Wilf Prentice, Ken Schuweiler.
2. BANGOR. *Mrs. Katie Thompson.*
3. BIGGAR. Kelly Foster, Harvey Renaud, Wayne Renaud, *Guy Wapple,* Robert Wapple.
4. BIG GULLY CREEK. *Wayne*

Harris, Sheila Lamont.

5. BIRCH HILLS. Terry Toews, *Donald A. Weidl.*

6. BRIGHTWATER RESERVOIR. Mary Gilliland, Cliff Matthews, *Alan R. Smith.*

7. BROADVIEW. *Dave J. Chaskavich,* Don Weidl.

8. CROOKED LAKE. A Weidl, *Donald A. Weidl.*

9. DILKE. *Margaret Belcher,* Bertha Wilson.

10. DUCK MOUNTAIN PARK. Bill Anaka, *Joyce Anaka,* Ben Kruser, JoAnn Radish.

11. *DUVAL. J. Rawdon Bieber, Tony Lang, Iain Richardson, Lloyd Saul,* Catherine M. Schmidt.

12. EASTEND. Bart and Bruce Lebastard, *Henri Lebastard.*

13. ENDEAVOUR. Norman Harris.

14. FORT QU'APPELLE. *Manley Callin,* Errol Cochrane, Ethel Cockwill, Bernie de Vries, David and Ron Hooper, Alice Laing, Vic

Horned Lark *Four Winds Prairie Photography* and Lois Lamontagne, Ray Mlazgar, Dick and Sonia Morrell, James Peigan, Lorne and Shawn Rowell, Bruno Skolski.

15. FORT WALSH. Chris Escott, Wayne Harris, Sheila Lamont, Wilkes Parsonage, Wayne Renaud, *Guy Wapple,* Robert Wapple.

16. GARDINER DAM. Wayne Harris, Sheila Lamont, Wayne Renaud, *Guy Wapple,* Robert Wapple.

17. GLAMIS-WISETON. Brian H. Jones, *G.L. Jones.*

18. GOODSOIL. *Dr. and Mrs. D. N. Morton,* Richard Morton.

19. GOOD SPIRIT LAKE. *Bill Anaka,* Joyce Anaka.

20. GOVENLOCK. *Wayne Harris,* Sheila Lamont, Wayne Renaud, Guy Wapple, Robert Wapple.

21. GRAND CENTRE (Sask-Alta). *J. F. Roy,* Robin and Ryan Roy.

22. GREENWATER LAKE. *Glen O. Honig.*

23. HUMBOLDT. *Ed Brockmeyer,* Ev and Warren Hoffman, Dwayne Saretsky.

24. INDIAN HEAD. Cecil and Betty Ashmore, Jan Beattie, Yvonne Brown, Raymond Crawford, Jim Elliott, Richard Escott, *Roger Gray,* Mavis Gray, Joan Halford, Gordon Howe, Janet LePrieur, Eric Peterson, Joan and Lorne Scott, Gertie and Reg Scott, Fred Skinner, Donna and Ron Thompson and family, Anne and Gordon Willerth.

25. KELVINGTON. Chris Donovan, *James Donovan.*

26. KENASTON. *P. Lawrence Beckie.*

27. KINDERSLEY. *Jean M. Harris.* Keith Harris.

28. KUTAWAGAN LAKE. *Wayne Harris,* Sheila Lamont.

29. LA RONGE. *Jim Paul.*

30. LAST MOUNTAIN LAKE. *Wayne Harris,* Sheila Lamont.

31 LEADER. *Daisy D. Meyers.*

32. LOON LAKE. A Davis, *P. Davis,* J. Huys, M. Huys, Frank Scott.

33. LOVE-TORCH RIVER. *Bert Dalziel,* Joan Dalziel, Betty, Bruce, Sean and Troy Donovan, Elwood and Pearl French, Bill and Lynn Mathews, Bill Rode.

34. LUSELAND. *Kim Finley,* Estelle Martfeld, Bev and Brent Honeker.

35. MAIDSTONE BRIDGE. *Wayne Harris,* Sheila Lamont.

36. MELFORT. *Philip Curry,* Glenn Galloway, Ted Morton, John Waddington, Ron Zdan.

37. MOOSE JAW. Ben and Isabelle Cruise, Alice and Carl Ellis, Doug Francis, Alan, Arthur, Hartley and Edward Fredeen, Edith and Pat Kern, Eve King, Cy Knight, *Leith Knight,* Bernice and Moray Lewis, Arie and Henry Van Dorland, Sheina Wait.

38. NIPAWIN. Bert and Joan Dalziel, Mr. and Mrs. Fred Diener, *Bruce Donovan.*

39. NUT MOUNTAIN. Chester Sloan, *Dianne Sloan,* Marguerite Sloan.

40. PELICAN NARROWS. *Gabrielle Hembry,* Gordon Speirs.

41. PIKE LAKE. Margaret duChalard, Chris Escott, Mary Gilliland, *J. B. Gollop,* Jane and Mike Gollop,

Frank Roy, Stan Shadick, Jim Wedgewood.

42. PRINCE ALBERT. *Pamela and John Burt.*

43. PRINCE ALBERT NATIONAL PARK. Cam Alexander, Doug Anions, Chris Doupe, Greg Keesey, *Bradley Muir,* June-Ann Muir, Kathy Ryhorchuk, Pat Strutt, Jean and Mervyn Syroteuk, Andrew Whiting.

44. RAYMORE. *Wayne Harris,* Sheila Lamont.

45. RED DEER HILL. Kevin Aschim, *Kim Hruska.*

46. REGINA. Chris Adam, Margaret Belcher, Tom Beveridge, Lucille Bradatsch, Frank Brazier, Phil Browne, Paul Chytyk, Kathleen Donaver, Paule Hjertaas, *Robert Kreba,* Tony Lang, Bob Luterbach, Christine MacDonald, Jim Materi, John McDonald, Ron Myers, Chuck Newyar, Irene Pierson, Brian Rainey, Sarogini Ramnarine, Tom Riffel, Frank Switzer, Ian Switzer, Dorothy Tegart, John Triffo, Christophe Wilhelm, Pierre Wilhelm.

47. ROUND LAKE. *Doug Francis,* Joe Grimeau, Pat Kern, Les Tremblay.

48. ST. WALBURG. *Nigel Caulkett.*

49. SASKATOON. Michele Anderson, Juhachi Asai, Eric Densem, Anne Dzus, Chris Escott, Grant Forsythe, Charles, John, Jon, Naomi, Pauline and Tom Gerrard, Mary Gilliland, Bernie Gollop, John Hanbidge, Simon Heath, Mary Houston, *Stuart Houston,* Blake Maybank, Don and Jo McRobbie, Betty and Jim Mundy, Bill Nickel, Jim and Pat O'Neil, Evelyn Paterson, John Polson, Charlie Simpson, Alan Smith, Bruce Tomlinson, Jim and Shirley Wedgwood, David Wright, Kelly Wylie.

50. SCOTT. Wayne Renaud, *Guy Wapple,* Robert Wapple.

51. SKULL CREEK. *J. Bennetto,* Michelle Schuler.

52. SPRING VALLEY. Allan, Larry & Nick Bogdan, *Flossie Bogdan,* Ernie Jordison.

53. SQUAW RAPIDS. *Wayne Harris,* Sheila Lamont, Wayne Renaud, Guy Wapple, Robert Wapple.

54. SOMME. Margaret and Stan Back, Alice, Edwin and Shirley Billeter, Ian and Myrla Birch, David and Wesley Black, Florence Chase, *Donald Hooper.*

55. SWIFT CURRENT. Doug Adams, Catherine Dumouchel, Stan Greenwood, *Christopher Harris,* Earle Hayes, Jack Ricou, Russ Wall.

56. TISDALE. *Joyce Mohr.*

57. TONKIN. *Ben Kruser,* JoAnn Radish.

58. WAUCHOPE. *Dale Hjertaas,* Paule Hjertaas.

59. WHITE BEAR. Bruce Brantley, Lynette Jordheim, *Sig Jordheim.*

60. WHITEBEECH. Ida Wotherspoon, *Lindsay Wotherspoon,* Ed Terlesky.

61. WOLSELEY SOUTH. *Dale Chay,* Donald Hayward.

62. YORKTON. Joyce Anaka, Bill Anaka, Joyce Baines, Walter Baines, *Joe Bergerman,* Warren Hjertaas, Lance Irvine, Ben Kruser, JoAnn Radish, Birkert Satterthwaite, Harold Wilkinson.

LOCATIONS OF COUNTS

1. ASSINIBOIA
2. BANGOR
3. BIGGAR
4. BIG GULLY CREEK
5. BIRCH HILLS
6. BRIGHTWATER RESERVOIR
7. BROADVIEW
8. CROOKED LAKE
9. DILKE
10. DUCK MOUNTAIN PARK
11. DUVAL
12. EASTEND
13. ENDEAVOUR
14. FORT QU'APPELLE
15. FORT WALSH
16. GARDINER DAM
17. GLAMIS-WISETON
18. GOODSOIL
19. GOOD SPIRIT LAKE
20. GOVENLOCK
21. GRAND CENTRE (Sask.-Alta.)
22. GREENWATER LAKE
23. HUMBOLDT
24. INDIAN HEAD
25. KELVINGTON
26. KENASTON
27. KINDERSLEY
28. KUTAWAGAN LAKE
29. LA RONGE
30. LAST MOUNTAIN LAKE
31. LEADER
32. LOON LAKE
33. LOVE-TORCH RIVER
34. LUSELAND
35. MAIDSTONE BRIDGE
36. MELFORT
37. MOOSE JAW
38. NIPAWIN
39. NUT MOUNTAIN
40. PELICAN NARROWS
41. PIKE LAKE
42. PRINCE ALBERT
43. PRINCE ALBERT NATIONAL PARK
44. RAYMORE
45. RED DEER HILL
46. REGINA
47. ROUND LAKE
48. ST. WALBURG
49. SASKATOON
50. SCOTT
51. SKULL CREEK
52. SPRING VALLEY
53. SQUAW RAPIDS
54. SOMME
55. SWIFT CURRENT
56. TISDALE
57. TONKIN
58. WAUCHOPE
59. WHITE BEAR
60. WHITEBEECH
61. WOLSELEY SOUTH
62. YORKTON

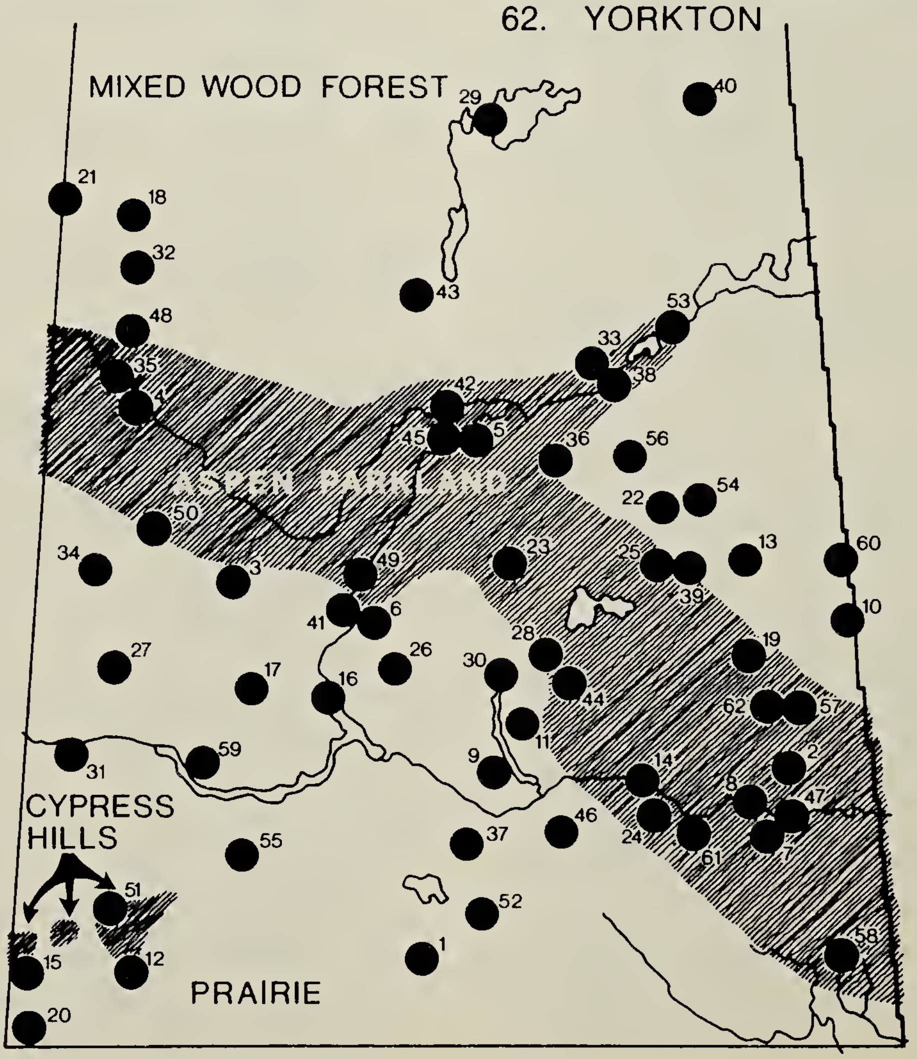
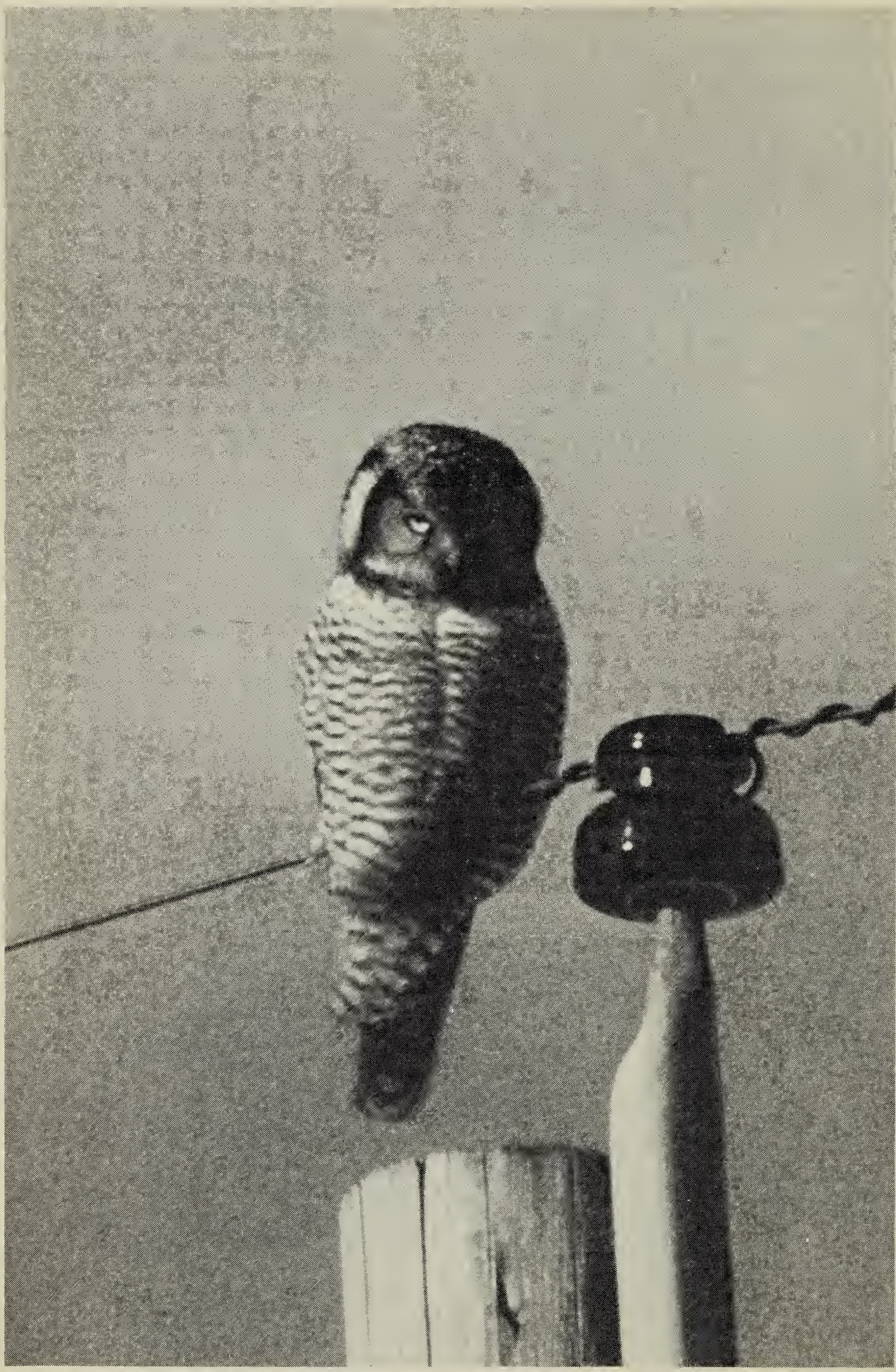


Table 1. CHRISTMAS COUNT COVERAGE AND WEATHER CONDITIONS

LOCALITY / COVERAGE AND CONDITIONS	KILOMETERS BY VEHICLE	KILOMETERS ON FOOT OR SKIS	HOURS BY VEHICLE	HOURS ON FOOT OR SKIS	HOURS WATCHING FEEDERS OR OWLING	TEMPERATURE RANGE (°C)	WIND SPEED (KM/HR)	SNOW DEPTH (CM)	SKY CONDITIONS
ASSINIBOIA	60	–	2	–	–	-2/+2	10-20	13	mostly clear; clear
BANGOR	26	–	0.5	–	1	-30/-18	20-25	15-20	partly cloudy
BIGGAR	183	17	11	6.5	–	-38/-33	13-20	15-25	mostly clear; clouding
BIG GULLY CREEK	130	21	5	7	–	-19/-5	5-15	30-35	clear; partly cloudy
BIRCH HILLS	144	–	5	–	3	-36/-33	0-5	20-30	clear
BRIGHTWATER RESERVOIR	80	5	8	4	–	-30	0-5	5-20	mostly clear
BROADVIEW	119	9	4	3	–	-22/-19	20-15	10-15	partly cloudy
CROOKED LAKE	83	2	4	1	–	-11/-9	10-15	20-30	overcast, light snow; cloudy
DILKE	100	3	2.5	1	3	-7/-2	10	0-10	clear
DUCK MOUNTAIN PARK	22	22	0.5	5.5	–	-4/0	15-20	20	light overcast
DUVAL	205.5	10	7.5	3	–	-13/-18	4-16	4-30	clear
EASTEND	15	2	4	1.5	–	-13		12	
ENDEAVOUR	23	3	3	2	–	-22/-12	5-10	20-25	partly cloudy; overcast
FORT QU'APPELLE	200	–	10	–	3	-12	27	13	
FORT WALSH	90	41	8.5	20.5	1	-30/-20	0-60	10-40	clear; partly cloudy
GARDINER DAM	169	12	13	4	–	-36/-25	0-10	10-20	clear
GLAMIS - WISETON	55	3.5	2.5	1	–	-10/-15	10-20	12-20	mostly clear
GOODSOIL	25	–	3	–	6	-7/0	0-5	15-20	clear
GOOD SPIRIT LAKE	90	2.5	4	0.5	1	-17/-19	30-40	17	mostly clear
GOVENLOCK	110	9	10.5	5.5	–	-34/-20	0-30	1-10	clear; partly cloudy
GRAND CENTRE	130	1	4	1	–	-12/-13	19-24	25-30	overcast
GREENWATER LAKE	–	5	–	2	5	-15/-5	0	20-25	mostly clear
HUMBOLDT	15	8	0.5	2	4	-10/-12	5-10	18-20	mostly clear
INDIAN HEAD	32	5	2	1	6	-16/-18	20-25	20-24	mostly clear; partly cloudy
KELVINGTON	10	–	–	–	4	-10/-5	0	18-24	clear
KENASTON	100	5	4	2	–	-15/-10	10	20	mostly clear
KINDERSLEY	26	–	2	–	–				overcast
KUTAWAGAN LAKE	250	3	7	2	–	-41/-37	8-40	5-25	clear
LA RONGE	48	9	3	2	0.5	-17/-8	10-18	20-30	mostly clear; partly cloudy
LAST MOUNTAIN LAKE	180	3	6	2	–	-5/+3	5-30	6-8	clear; partly cloudy
LEADER	4	3	1	2	–	-1/+5	10-20	8-16	partly cloudy
LOON LAKE	15	2	0.5	1	3	0/-5	5	30	overcast, light rain
LOVE - TORCH RIVER	100	–	4	–	6	-25/-14	0-5	20-25	partly cloudy; overcast
LUSELAND	43	10	1.5	4	–	-20/-25	10-15	6-13	mostly clear; clear
MAIDSTONE BRIDGE	130	5	6	2	–	-15/-5	0-10	30-35	partly cloudy
MELFORT	20	3	1	3	1	-15/-10	0	20-30	clear
MOOSE JAW	196	15	9.5	7.5	1	-13/-15	15-20	7-15	overcast
NIPAWIN	40	–	2	–	2	-29/-24	0-5	30-35	clear
NUT MOUNTAIN	10	1	0.5	0.5	8	-16/-13	5	21-26	clear; mostly cloudy
PELICAN NARROWS	30	3	2	1	–	-15/-20	0-10	10-20	clear; mostly clear
PIKE LAKE	148	16	12	11	–	-9/0	0-15	10-20	partly cloudy
PRINCE ALBERT	–	–	–		10	-10/5	5-10	10-25	mostly cloudy,rain; mostly clear
P.A. NATIONAL PARK	152	20	9.5	12.5	13.5	-25/-31	10-15	15-25	partly cloudy; clear
RAYMORE	235	5	8	3	–	-38/-27	5-25	25-30	clear; becoming partly cloudy
RED DEER HILL	90	14	3	3.5	–	-10/-15	5-35	10-15	clear
REGINA	427	77	23	23	–	-13/-10	20-26	15-30	partly cloudy,light snow; mostly clear
ROUND LAKE	61	4.5	4	2	2	-5/+5	10	10-15	mostly clear; partly cloudy
ST. WALBURG	150	10	4	3	–	-10/-15	10-15	15-30	mostly cloudy
SASKATOON	320	47	36	33	16	-14/-11	11-19	12-18	overcast
SCOTT	245	11	7	5.5	–	-19/-9	3-10	10-20	partly cloudy; mostly clear
SKULL CREEK	16	6	2	2	0.5	-18/-15	25-30	30	overcast
SPRING VALLEY	122	10	5	2	–	-2/+1	15-25	10-15	mostly clear
SQUAW RAPIDS	100	16	13	7	–	-37/-20	5-35	8-10	overcast; intermittent freezing rain
SOMME	330	3	9	2	5	-4/-3	0-5	20-30	
SWIFT CURRENT	307	21	11.5	9.5	–	-35/-25	30-40	5-75	clear
TISDALE	30	–	1	–	2	-25/-20	10-15	16	clear; partly cloudy
TONKIN	34	2	1.5	2	–	-22/-24	0-5	2-10	clear
WAUCHOPE	46	6	1.5	3	1.5	-10	15	15-20	
WHITE BEAR	15	18	0.5	6	–	-9/-6	0-1	20-40	clear
WHITEBEECH	20	2	1	1	6	-4/-8	0-5	14-16	clear
WOLSELEY SOUTH	62	1	2	0.5	–	-5	0	9-11	clear
YORKTON	155	4	2	2	–	-23	8	10	clear; partly cloudy



Northern Hawk-Owl *R. McCleary*

Table 2-1. SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.

LOCALITY SPECIES	ASSINIBOIA January 3	BANGOR December 24	BIGGAR December 22	BIG GULLY CREEK December 29	BIRCH HILLS December 19	BRIGHTWATER RESERVOIR December 18	BROADVIEW December 28	CROOKED LAKE December 26	DILKE January 1	DUCK MOUNTAIN PARK January 2
MALLARD			1					1		
COMMON GOLDENEYE										
BALD EAGLE				1						
NORTHERN GOSHAWK			1	2						
GOLDEN EAGLE										
MERLIN			1	1		1				
GRAY PARTRIDGE	50		10	+7		12	8			
RING-NECKED PHEASANT	7			+1						
RUFFED GROUSE				1			1			
SHARP-TAILED GROUSE	6		43	12		2	5	99	23	
ROCK DOVE			154	77	55	27	9	2	12	
GREAT HORNED OWL	2		2	2	2	2	1	1	2	
SNOWY OWL	2		+1	+1	1					
DOWNY WOODPECKER		1	1	2	1	1	1		+1	1
HAIRY WOODPECKER		1		4	1	1	2	1		
THREE-TOED WOODPECKER										
BLACK-BACKED WOODPECKER				1						
NORTHERN FLICKER										
PILEATED WOODPECKER				+1						
HORNED LARK			40	2					+7	
GRAY JAY				1						
BLUE JAY				2	+1		2	1		1
BLACK-BILLED MAGPIE	20	1	58	39	13	23	16	8	19	
COMMON RAVEN			2	9	2					5
BLACK-CAPPED CHICKADEE		3	17	28	6	10	9	11	2	5
BOREAL CHICKADEE			1	1						
RED-BREASTED NUTHATCH										
WHITE-BREASTED NUTHATCH								1		
AMERICAN ROBIN										
BOHEMIAN WAXWING	2		21	21	19	2	5	4		
NORTHERN SHRIKE				1				1		
EUROPEAN STARLING			1							
AMERICAN TREE SPARROW										
DARK-EYED JUNCO										
SNOW BUNTING	80	150	2310	251	339	1040	255	400	100	
RUSTY BLACKBIRD				1						
ROSY FINCH			1							
PINE GROSBEAK				7					+4	
RED CROSSBILL				3						
WHITE-WINGED CROSSBILL				7						
COMMON REDPOLL				62						
HOARY REDPOLL				2						
EVENING GROSBEAK				29	8		2			
HOUSE SPARROW	400	2	843	351	75	55	90		254	
NO. SPECIES IN TABLE 3&4	0	0	1	4	0	0	0	0	0	0
NO. COUNT DAY SPECIES	9	6	18	30	12	12	14	12	7	4
NO. COUNT PERIOD SPECIES	9	6	20	34	13	12	14	12	10	4
NO. COUNT DAY INDIVIDUALS	569	158	3507	958	522	1176	406	530	412	12

Table 2-2. *SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.*

LOCALITY SPECIES	DUVAL December 29	EASTEND December 26	ENDEAVOUR January 2	FORT QU'APPELLE December 31	FORT WALSH December 17	GARDINER DAM December 19	GLAMIS - WISETON December 27	GOODSOIL January 1	GOOD SPIRIT LAKE December 28	GOVENLOCK December 18	GRAND CENTRE December 26
MALLARD				7	3	346					
COMMON GOLDENEYE				4		7					
BALD EAGLE				+1	+1	6					
NORTHERN GOSHAWK			+1		3	1					
GOLDEN EAGLE		1			3					2	
MERLIN					1				1		
GRAY PARTRIDGE	6			+4	10	71	46		+7	25	
RING-NECKED PHEASANT		2		5	15					5	
RUFFED GROUSE			1	+2	1				1		
SHARP-TAILED GROUSE			2	1	20	52	2		1	46	
ROCK DOVE	28			25	6	85	33				
GREAT HORNED OWL	1	1	1	2	+1	1	1		1	3	
SNOWY OWL				+1		2	2				
DOWNY WOODPECKER	1	1		4	9	1			8		
HAIRY WOODPECKER		1	1	1	9	1		+2	6		1
THREE-TOED WOODPECKER					1			2			
BLACK-BACKED WOODPECKER											
NORTHERN FLICKER					+1					1	
PILEATED WOODPECKER									+1		
HORNED LARK		21			6	6				519	
GRAY JAY								2			
BLUE JAY			1	5	1			4	2		3
BLACK-BILLED MAGPIE	11	75	6	20	168	95	3	6	10	4	12
COMMON RAVEN			14		3			5	2		37
BLACK-CAPPED CHICKADEE	3	9	7	33	65	4	+2	4	30		12
BOREAL CHICKADEE											
RED-BREASTED NUTHATCH				2	4						
WHITE-BREASTED NUTHATCH				1					1		
AMERICAN ROBIN										1	
BOHEMIAN WAXWING	25	100		17	54			+30	+3	2	
NORTHERN SHRIKE				+1	2	1					
EUROPEAN STARLING				3						3	
AMERICAN TREE SPARROW					6					1	
DARK-EYED JUNCO			1		2					1	
SNOW BUNTING	9		150	100	222	3740	50	100	95	1147	469
RUSTY BLACKBIRD					17					1	
ROSY FINCH					488					3	
PINE GROSBEAK			15		2			+25	1		
RED CROSSBILL					7						
WHITE-WINGED CROSSBILL											
COMMON REDPOLL		2		+2	41					7	
HOARY REDPOLL											
EVENING GROSBEAK				25				50	8		5
HOUSE SPARROW	549	6	14	311	40	1075	50	4	197	605	50
NO. SPECIES IN TABLE 3&4	0	0	0	1	10	2	0	0	0	3	0
NO. COUNT DAY SPECIES	9	11	12	19	36	19	8	9	15	21	8
NO. COUNT PERIOD SPECIES	9	11	13	25	40	19	9	12	18	21	8
NO. COUNT DAY INDIVIDUALS	633	219	213	568	1227	5522	187	177	364	2473	589

Table 2-3. SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.

GREENWATER LAKE January 1	HUMBOLDT December 26	INDIAN HEAD December 27	KELVINGTON January 1	KENASTON December 30	KINDERSLEY December 26	KUTAWAGAN LAKE December 21	LA RONGE December 26	LAST MOUNTAIN LAKE January 2	LEADER January 2	LOON LAKE January 2	*LOCALITY* / *SPECIES*
		30									MALLARD
											COMMON GOLDENEYE
		+1							1		BALD EAGLE
											NORTHERN GOSHAWK
								+1			GOLDEN EAGLE
											MERLIN
	+6	35		8	+6	21		42			GRAY PARTRIDGE
		+1							7		RING-NECKED PHEASANT
1											RUFFED GROUSE
	5	20		3		3	1	26	2		SHARP-TAILED GROUSE
	+12	108	5	13	11	1		32			ROCK DOVE
	+3	2		1		5		+1	1		GREAT HORNED OWL
		+4			2	1		5			SNOWY OWL
2	1	8	1	+2						1	DOWNY WOODPECKER
2	1	7	2							2	HAIRY WOODPECKER
											THREE-TOED WOODPECKER
							1				BLACK-BACKED WOODPECKER
											NORTHERN FLICKER
											PILEATED WOODPECKER
		+1		16		+1		+4			HORNED LARK
		+1					3			8	GRAY JAY
+1		6					2			2	BLUE JAY
	2	42	3	18	5	37		63	32	2	BLACK-BILLED MAGPIE
4			10				83			3	COMMON RAVEN
4	12	48	5	+2		3	5		2	14	BLACK-CAPPED CHICKADEE
		+1					4				BOREAL CHICKADEE
		16									RED-BREASTED NUTHATCH
4		3									WHITE-BREASTED NUTHATCH
		1	+2								AMERICAN ROBIN
	7	400	32	+1	+3	2		11			BOHEMIAN WAXWING
											NORTHERN SHRIKE
		6									EUROPEAN STARLING
										10	AMERICAN TREE SPARROW
		1								+2	DARK-EYED JUNCO
	200	380	200	367	75	3675		22		120	SNOW BUNTING
									1		RUSTY BLACKBIRD
											ROSY FINCH
		24	12								PINE GROSBEAK
											RED CROSSBILL
											WHITE-WINGED CROSSBILL
		30					22				COMMON REDPOLL
											HOARY REDPOLL
3	12		35							30	EVENING GROSBEAK
	4	270	6	32	22	512		825	25	12	HOUSE SPARROW
0	0	1	0	1	0	0	0	1	0	0	NO. SPECIES IN TABLE 3&4
7	9	21	11	8	5	10	8	8	8	11	NO. COUNT DAY SPECIES
8	12	27	12	12	7	11	8	12	8	12	NO. COUNT PERIOD SPECIES
20	244	1438	311	458	115	4260	121	1026	71	204	NO. COUNT DAY INDIVIDUALS

Table 2-4. SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.

LOCALITY SPECIES	LOVE - TORCH RIVER December 31	LUSELAND December 27	MAIDSTONE BRIDGE December 28	MELFORT December 29	MOOSE JAW January 2	NIPAWIN December 18	NUT MOUNTAIN December 26	PELICAN NARROWS December 26	PIKE LAKE January 2	PRINCE ALBERT January 2	P.A. NATIONAL PARK December 17
MALLARD											
COMMON GOLDENEYE											
BALD EAGLE											
NORTHERN GOSHAWK			+1						3		
GOLDEN EAGLE											
MERLIN		1			+1						
GRAY PARTRIDGE		6	+3		105	6	6				
RING-NECKED PHEASANT					26						
RUFFED GROUSE			1				1		2		5
SHARP-TAILED GROUSE			17		8		1		28		
ROCK DOVE		21	3	+6	186	15			9		
GREAT HORNED OWL			1						2		
SNOWY OWL			1		3	+1					
DOWNY WOODPECKER	1		2	1	3		3		4	1	1
HAIRY WOODPECKER	6	1	3	+1	1	2	2		7	1	1
THREE-TOED WOODPECKER								+1			1
BLACK-BACKED WOODPECKER								1			
NORTHERN FLICKER											
PILEATED WOODPECKER								+1			
HORNED LARK		6	+1		3						
GRAY JAY	1					1		+4		1	9
BLUE JAY	10	1	4			2	1		16	4	1
BLACK-BILLED MAGPIE	5	17	37	6	106	8	7		82	2	8
COMMON RAVEN	21		+2	2		75	+50	45	2	20	33
BLACK-CAPPED CHICKADEE	32	2	36	12	28	3	7	4	47	10	19
BOREAL CHICKADEE	2			1				1			21
RED-BREASTED NUTHATCH					+1						
WHITE-BREASTED NUTHATCH									2	1	2
AMERICAN ROBIN					1						
BOHEMIAN WAXWING	4			42	544	24	25		198		
NORTHERN SHRIKE		1	1						4		
EUROPEAN STARLING					155	9					
AMERICAN TREE SPARROW											
DARK-EYED JUNCO								+2			
SNOW BUNTING	151	2350	1320	50	85	11	+150		245	30	
RUSTY BLACKBIRD											
ROSY FINCH											
PINE GROSBEAK	+1		4	6	8	18	2		11		+2
RED CROSSBILL											
WHITE-WINGED CROSSBILL											
COMMON REDPOLL								15			62
HOARY REDPOLL								10			
EVENING GROSBEAK	130		7	21	3	132	28		31	30	+30
HOUSE SPARROW	37	41	375	68	733	64			164		1
NO. SPECIES IN TABLE 3&4	0	1	1	0	1	0	0	3	1	0	1
NO. COUNT DAY SPECIES	12	12	16	10	18	14	11	6	19	10	14
NO. COUNT PERIOD SPECIES	13	12	20	12	20	15	13	13	19	10	16
NO. COUNT DAY INDIVIDUALS	400	2453	1837	209	1999	370	83	76	859	100	166

Table 2-5. SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.

RAYMORE December 20	RED DEER HILL December 27	REGINA December 31	ROUND LAKE January 2	ST. WALBURG December 26	SASKATOON December 26	SCOTT December 31	SKULL CREEK December 26	SPRING VALLEY January 2	SQUAW RAPIDS December 24	SOMME December 30	LOCALITY SPECIES
		10	13		7				6		MALLARD
					75				56		COMMON GOLDENEYE
1									5		BALD EAGLE
2									1	+1	NORTHERN GOSHAWK
							+2	+1			GOLDEN EAGLE
+1	1	3	1		7						MERLIN
19		43	7		29	42		49		8	GRAY PARTRIDGE
+1			6				11				RING-NECKED PHEASANT
4		1	2	1					5	2	RUFFED GROUSE
28	9	4	12	7	48	8	+4	89	2	6	SHARP-TAILED GROUSE
122	59	1039			1596	151		24		+3	ROCK DOVE
5		10	1		4	2	2	2	1	+1	GREAT HORNED OWL
+1		5			1	3		+1		1	SNOWY OWL
2		2	9		9		4		1	8	DOWNY WOODPECKER
3	1		8	2	15		1		3	21	HAIRY WOODPECKER
									2		THREE-TOED WOODPECKER
						1			1		BLACK-BACKED WOODPECKER
					1		1				NORTHERN FLICKER
			2						1	3	PILEATED WOODPECKER
5		1				1	56	7			HORNED LARK
	11			1					3	14	GRAY JAY
+1	4		5	2	23		1		3	20	BLUE JAY
53	26	45	25	5	424	34	16	12	6	23	BLACK-BILLED MAGPIE
1	32		1	12		1			69	61	COMMON RAVEN
34	26	25	35	7	130	6	15		3	57	BLACK-CAPPED CHICKADEE
		4		6	9	4			8	3	BOREAL CHICKADEE
		6			18				1		RED-BREASTED NUTHATCH
		2	10		1					1	WHITE-BREASTED NUTHATCH
					1						AMERICAN ROBIN
17	13	934		6	6047	3	+110	47		+5	BOHEMIAN WAXWING
2			+1				+1			1	NORTHERN SHRIKE
3			6	6	1000						EUROPEAN STARLING
							6				AMERICAN TREE SPARROW
1		1									DARK-EYED JUNCO
2762	185	496	250	225	921	2817	15	113	895	753	SNOW BUNTING
1			+1								RUSTY BLACKBIRD
											ROSY FINCH
6	81	1		4	12	10			9	35	PINE GROSBEAK
	32				2						RED CROSSBILL
2		10				5					WHITE-WINGED CROSSBILL
217					18				160		COMMON REDPOLL
2									1		HOARY REDPOLL
3	25		50		44				8	83	EVENING GROSBEAK
1437	40	1625	40	7	2957	307	35	360		46	HOUSE SPARROW
0	0	4	1	0	6	0	2	0	4	1	NO. SPECIES IN TABLE 3&4
25	15	25	19	14	30	16	13	9	26	20	NO. COUNT DAY SPECIES
29	15	25	22	14	32	16	18	11	26	24	NO. COUNT PERIOD SPECIES
4732	545	4834	483	291	13421	3395	172	703	1397	1147	NO. COUNT DAY INDIVIDUALS

Table 2-6. SPECIES RECORDED FROM MORE THAN THREE LOCALITIES. A PLUS SIGN INDICATES A HIGH COUNT FOR A SPECIES SEEN DURING COUNT PERIOD BUT NOT ON COUNT DAY.

SPECIES / LOCALITY	SWIFT CURRENT December 17	TISDALE December 29	TONKIN December 31	WAUCHOPE December 26	WHITE BEAR January 1	WHITEBEECH January 1	WOLSELEY SOUTH January 1	YORKTON December 31	NUMBER OF COUNTS PER SPECIES
MALLARD	2								11
COMMON GOLDENEYE									4
BALD EAGLE									8
NORTHERN GOSHAWK					+1				11
GOLDEN EAGLE	1				+1				8
MERLIN	1			1				1	15
GRAY PARTRIDGE	39		8		22		+3		34
RING-NECKED PHEASANT	1								13
RUFFED GROUSE				1		+1	1	1	21
SHARP-TAILED GROUSE				31	+57		29	1	40
ROCK DOVE	108		1	1	150			11	37
GREAT HORNED OWL	4		1	1	2		+1		39
SNOWY OWL	1		1					1	23
DOWNY WOODPECKER	1	2		1		2			39
HAIRY WOODPECKER		2		1		2	1		41
THREE-TOED WOODPECKER									5
BLACK-BACKED WOODPECKER									5
NORTHERN FLICKER									4
PILEATED WOODPECKER									6
HORNED LARK	37								20
GRAY JAY						1			15
BLUE JAY						3		1	33
BLACK-BILLED MAGPIE	41	4	3	17	22	6	5	30	58
COMMON RAVEN		10	+6			7		1	33
BLACK-CAPPED CHICKADEE		5		10	1	6	4	7	55
BOREAL CHICKADEE			+1						15
RED-BREASTED NUTHATCH									7
WHITE-BREASTED NUTHATCH	+1			1					14
AMERICAN ROBIN									5
BOHEMIAN WAXWING	249			1	+1	+5	10	112	42
NORTHERN SHRIKE									12
EUROPEAN STARLING	9				1			2	13
AMERICAN TREE SPARROW									4
DARK-EYED JUNCO				1					9
SNOW BUNTING	1085	50	4	+5	+500	+17	31	200	55
RUSTY BLACKBIRD							1		7
ROSY FINCH	25				25				5
PINE GROSBEAK		10				+7			26
RED CROSSBILL									4
WHITE-WINGED CROSSBILL									4
COMMON REDPOLL				46					13
HOARY REDPOLL									4
EVENING GROSBEAK				1		20		1	29
HOUSE SPARROW	896	20	12	275	200	+2	100	831	54
NO. SPECIES IN TABLE 3&4	2	0	0	0	0	0	0	0	
NO. COUNT DAY SPECIES	18	8	7	15	8	8	9	14	
NO. COUNT PERIOD SPECIES	19	8	9	16	13	13	11	14	
NO. COUNT DAY INDIVIDUALS	2503	103	30	389	423	47	182	1200	

Table 3. SPECIES SEEN IN THREE OR FEWER LOCALITIES.

SPECIES	LOCALITIES AND NUMBERS SEEN
COMMON LOON	GARDINER DAM, 1
HORNED GREBE	SASKATOON, 1
CANADA GOOSE	REGINA, 550
COMMON MERGANSER	GARDINER DAM, 27; SQUAW RAPIDS, 9
ROUGH-LEGGED HAWK	FORT WALSH, +1
GYRFALCON	BIGGAR, +1; BIG GULLY CREEK, 1
PRAIRIE FALCON	INDIAN HEAD,1; SKULL CREEK, +2
SPRUCE GROUSE	P.A. NATIONAL PARK, 2
SAGE GROUSE	FORT WALSH, 1; GOVENLOCK, 95
WILD TURKEY	FORT WALSH, 1
COMMON SNIPE	BIG GULLY CREEK, 1
NORTHERN HAWK-OWL	PELICAN NARROWS, +1
BARRED OWL	SOMME, 1
SHORT-EARED OWL	GOVENLOCK, 1; LAST MOUNTAIN LAKE, +1; MOOSE JAW, 1
BOREAL OWL	SQUAW RAPIDS, 1
BELTED KINGFISHER	FORT WALSH, 1
AMERICAN CROW	REGINA, 1
BROWN CREEPER	FORT WALSH, 1; ROUND LAKE, +1; SWIFT CURRENT, 1
GOLDEN-CROWNED KINGLET	FORT WALSH, 2; PIKE LAKE, 2
TOWNSEND'S SOLITAIRE	SASKATOON, +1
CEDAR WAXWING	LUSELAND, 6; SASKATOON, 19
SONG SPARROW	KENASTON, +1
WHITE-THROATED SPARROW	REGINA, 1; SASKATOON, 1
HARRIS' SPARROW	SASKATOON, 1
RED-WINGED BLACKBIRD	FORT WALSH, 1
PURPLE FINCH	FORT QU'APPELLE, 2; SASKATOON, +1; SWIFT CURRENT, 2

Table 4. BIRDS NOT IDENTIFIED TO SPECIES

SPECIES GROUP	LOCALITIES AND NUMBERS SEEN
GROUSE species	PELICAN NARROWS, +3
WOODPECKER species	BIG GULLY CREEK, 1; SQUAW RAPIDS, 3
LONGSPUR species	GOVENLOCK, 1; PELICAN NARROWS, +7
BLACKBIRD species	FORT WALSH, 1
CARPODACUS (Purple or Cassin's Finch)	FORT WALSH, 1
GROSBEAK - FINCH species	SKULL CREEK, 9
CROSSBILL species	FORT WALSH, 9; REGINA, 15
REDPOLL species	BIG GULLY CREEK, 35; MAIDSTONE BRIDGE, 25; SQUAW RAPIDS, 134

THE SASKATCHEWAN BIRD ATLAS — A NEW PROJECT

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What is a bird atlas? Simply stated a bird atlas is a collection of bird distribution maps in book form. The compilation of bird atlases is now enjoying worldwide popularity; several Canadian provinces, notably Ontario, have recently undertaken atlas projects.[1] [2] In most projects "atlasers" (mainly volunteers) determine the status of each species of bird for each of hundreds or even thousands of grid units (blocks of land). When the data for a species is transfered to a master grid the result is a map of the distribution of that species.

The Saskatchewan Bird Atlas.

The Saskatchewan Bird Atlas project is now underway. This project differs from other atlas projects in several ways. Firstly, we are initially using data that was not specifically gathered for the project. For example, we have coded most of data available from the *Blue Jay* and *Canadian Field-Naturalist*, and we are presently entering information from Canadian Wildlife Service files and the Prairie Nest Records Scheme. Data from personal files and notebooks will also be coded in the near future. Information gathered before 1966 will be considered as historical, while information gathered from 1966 to present will be considered as current. Since the atlas has a projected completion date of 1985, the "current" period will be 20 years long; this is the second difference as most other atlas schemes employ a 5-year period.

Thirdly, this atlas will use information gathered year-round and not just from the breeding season. However, at present, the emphasis will be placed on the accumulation of evidence of breeding. A fourth difference is the grid size, most atlas projects now under way use a 10-km square. However, since most other projects include areas of much higher population density than Saskatchewan (i.e., eastern North America and Europe) practical considerations dictate that we use a larger grid as well as the longer time period. The grid unit to be used in this project is the 1:50,000 scale mapsheet. All the grid units measure 27 km (17 mi.) north-south, but due to the convergance of lines of longitude towards the pole they vary in width from 36 km (23 mi.) in the extreme south to 28 km (18 mi.) in the extreme north.

Purpose

The information obtained by this project will hopefully be useful in:

1) the accurate delineation of the geographic distribution of the birds of the province.

2) the identification of factors which may influence the distribution of these birds

3) the identification of any long-term and non-cyclic changes in the distribution of Saskatchewan birds and the determination of the factors that may have brought about these changes.

4) the identification of areas of critical importance to breeding, migrating and wintering birds. Of particular interest are species with restricted ranges, or that are rare or endangered.

5) the identifcation of areas of high species diversity.

The atlas which will be the final product of this project will be a compendium of baseline data which will hopefully be useful to government agencies, environmental consultants and naturalists.

How to "atlas"

While participants may cover an unlimited number of mapsheets anywhere in the province, we would encourage you to cover one or a few mapsheets in "little known areas of the province". We will be glad to offer guidance in that regard, as well as provide you with the necessary 1:50,000 maps, instructions and coding forms. All that is then required is that you spend at least a few hours on a mapsheet and record your observations for each species by entering the appropriate status code (see below) on the atlas coding form. A species' status code can be upgraded on subsequent visits in the same or later years.

There are qualifications to several of these codes. For example, owls tend to nest earlier than other species, so breeding evidence for owls may be sought outside the "normal" breeding season; other species such as gulls may forage in 'apparently suitable nesting habitat' without actually nesting. Complete details are available in the first atlas newsletter.[3] Also note these changes in status codes as presented in the newsletter: codes B8 and B9 (probable breeding) are upgraded to BB8 and BB9 (confirmed breeding).

Participation

In most atlas projects volunteer work plays an important part since it is the amateur birders who collect most of the data. Anyone with some experience in identifying birds may participate in this project. Even if you do not wish to participate in the field work, your past records will be of great value to us. If you do not wish to code your past records, we will code them if you make your records available to us.

It is hoped that this project is structured in such a way that it can be fun and yet still yield information of scientific value. Parties may wish to get together and blitz a mapsheet; this may be an appropriate activity for the upcoming SNHS summer meet.

Anyone wishing to participate in the project is asked to contact:
Alan R Smith Overall Coordinator and Coordinator for south of 54°, Canadian Wildlife Service, 115 Perimeter Road, Saskatoon, Saskatchewan. S7N 0X4 (Tel. 665-4091 or 665-4087) or **Christopher I.G. Adam** Coordinator for north of 54°, 2636 Argyle Street, Regina, Saskatchewan. S4S 0K1 (Tel. 584-9564)

Progress to Date

We, along with our assistant Mary Gilliland, have made over 25,000 entries into the atlas. This is 12.5% of the estimated 200,000 records that would be necessary to complete the atlas. Several preliminary maps have been produced and one of them is included herein (Figure 1). This map of Burrowing Owl distribution is based primarily on the results of a questionnaire conducted by J.A. Wedgewood for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).[4] Recent fieldwork, however, has upgraded the status of this speices on about 10 mapsheets.

Saskatchewan Bird Atlas Status Codes

The following is an abridged list of the status codes to be used in this project:

W	— Winter Visitant	— Recorded between 15 December and 29 February	
S	— Spring Migrant	— Recorded between 1 March and 31 May	
F	— Fall Migrant	— Recorded between 1 August and 14 December	
V	— Summer Visitant	— Recorded between 1 June and 31 July *without evidence of breeding*	
P	— Possible Breeding	— *P-1.*	Observed in *suitable nesting habitat* during the breeding season (generally from 1 June to 31 July)
		— *P-2.*	Singing male(s) present or breeding song heard during the breeding season in *suitable nesting habitat.*
B	— Probable Breeding	— *B-3.*	Pair observed during the breeding season in *suitable nesting habitat*
		— *B-4.*	Courtship and display noted during the breeding season in *suitable nesting habitat*
		— *B-5.*	Permanent territory presumed through the registration of territorial behavior on 2 days at least a week or more apart at the same place
		— *B-6.*	Visiting *probable* nest-site
		— *B-7.*	Agitated behavior or anxiety calls from adults
BB	— Confirmed Breeding	— *BB-8.*	Brood patch on adult examined in the hand
		— *BB-9.*	Nest-building or excavation of nest-hole
		— *BB-10.*	Distraction display or injury-feigning
		— *BB-11.*	Used nest or eggshells found
		— *BB-12.*	Recently-fledged young (nidicolous species) or downy young (nidifugous species)
		— *BB-13.*	Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nests or nest-holes, the contents of which cannot be seen) or adult seen incubating
		— *BB-14.*	Adult seen carrying faecal sac or food for young
		— *BB-15.*	Nest containing eggs; includes cowbird eggs
		— *BB-16.*	Nest containing young; includes cowbird young

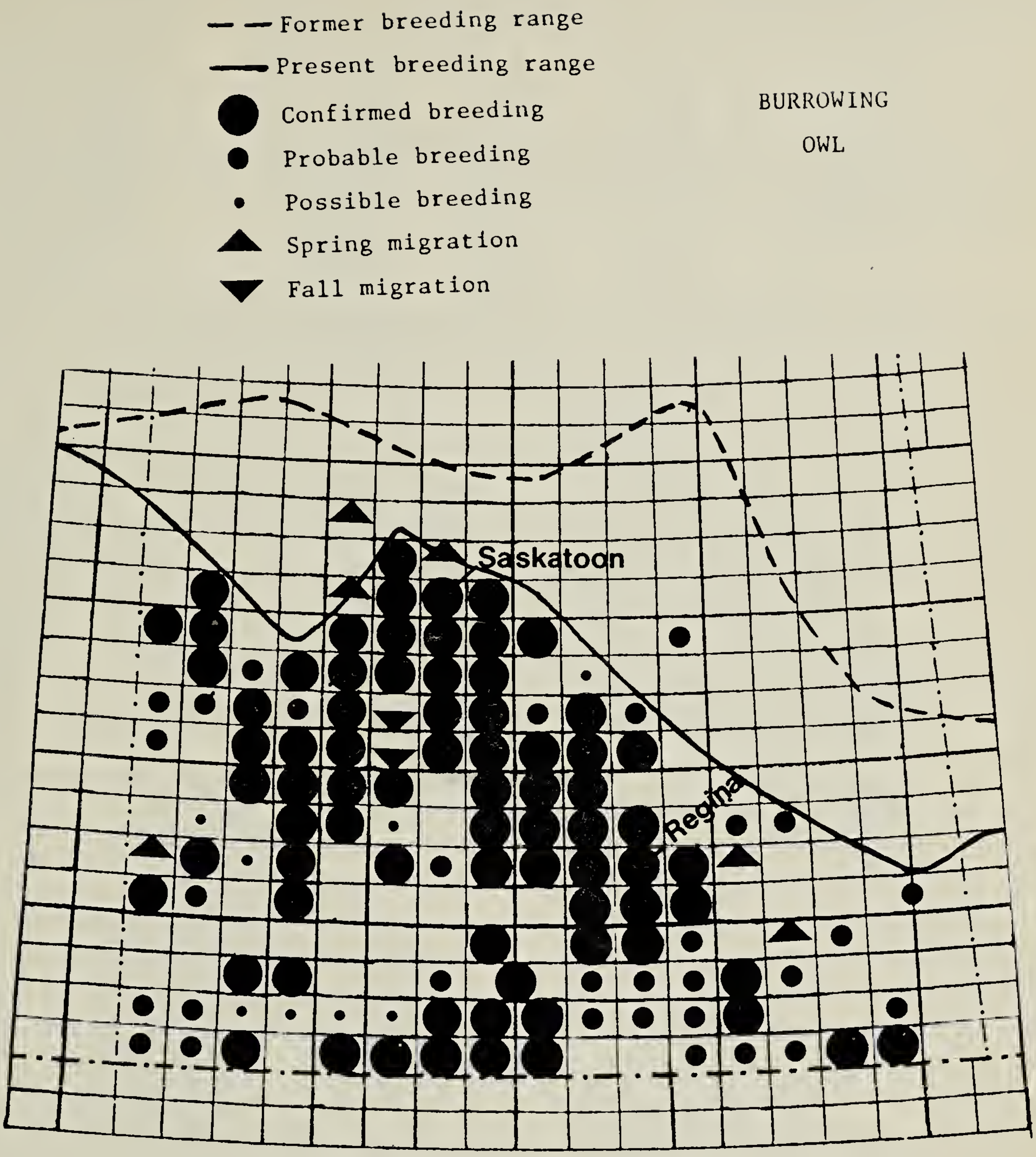

Figure 1.*The distribution of the Burrowing Owl in Saskatchewan. The dash-dot line indicates the provincial boundary. Rectangles are 1:50,000 mapsheets.*

Volunteers have already made a significant contribution to this project. Brenda Dale, Brian Johns, Chris Harris, Dale Hjertaas, Bohdan Pylypec and Stan Shadick have collectively contributed over 1000 records. Our thanks to these people for their efforts.

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[2] CADMAN, M., editor. Ontario Breeding Bird Atlas Newsletters. Nos. 1,2,3 and 4. Ontario Breeding Bird Atlas.

[3] SMITH, A., editor. 1983. Saskatchewan Bird Atlas Newsletter. Vol. 1(1). March 1983.

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TWENTY-THIRD ANNUAL NESTBOX REPORT FROM BRANDON, MANITOBA

ANN SMITH, 3011 Park Avenue, Brandon, Manitoba. R7B 2K3; and
NORAH LANE, HAZEL PATMORE, BARBARA ROBINSON, DAVID BARNES
and MAMIE McCOWAN

The southwest Manitoba nestbox project was carried out again in 1983 by the volunteer group "The Friends of the Bluebirds". This group held spring and fall meetings and maintained and monitored nest boxes during spring and summer. Over 60 separate reports were submitted and used to prepare this summary. Other members maintained nestlines but did not monitor the boxes closely enough to submit reports. A summary of nestbox occupants is given in Table 1.

In addition, cowbird eggs were found in two nests. Jim Spear noted "one nest contained a cowbird egg which the [Mountain] bluebird hatched and fed, her own three eggs did not hatch." The other was found with House Sparrow eggs and destroyed with them. Other occupants were four squirrels, one Northern Flying Squirrel and 29 mice. Mice were found when cleaning the boxes in spring and fall and do not appear to be a problem during the nesting season.

Cross breeding occurred again this year. A female Mountain and a male Eastern Bluebird produced five young and one unhatched egg in box #4900 on the line maintained by Perry and Alice Hopkins near Hartney. The Eastern male was killed by a car, but the female continued feeding and all five young fledged. The female raised a second brood with a Mountain male.

The Mountain Bluebird suffered a sharp decline in number of nestings in contrast with the other species, which showed increases. This decline is presumably due to a severe, late spring storm. Records at the Brandon Weather Office show that the temperature declined on 11 May 1983, from the previous day's 20° C. and hovered near zero for six days. 12 May had

Table 1. NUMBER OF NESTINGS IN NEST BOXES IN SOUTHWEST MANITOBA

Occupant	*Number of Nestings*
Mountain Bluebird	494*
Eastern Bluebird	87
Bluebird species	18
Mountain X Eastern Bluebird	1
Tree Swallow	872
House Wren	84
House Sparrow	127
European Starling	2
Black-capped Chickadee	1

*An additional 107 nests with frozen eggs were reported.

Mountain Bluebird male at nest *John Lane*

freezing rain, sleet and snow accompanied by winds of 60 to 65 km/hour. An accumulation of 5 cm of snow had occurred by nightfall on the 13th, and northwest winds of 40 km/hr were blowing. Snow fell again on the 14th. By the 15th the sky was clear but the temperature reached -11° C. that night and the minimum temperature did not rise above zero until the 17th.

This storm occurred just as the Mountain Bluebirds were laying eggs. A few lines were monitored just before and/or after the storm and illustrate the severity of the problem. The area west and north of Brandon was hit hardest with almost total destruction of eggs. Jim Spear found "36 nestings on the Shellmouth-Churchbridge line, but after the storm only six produced young . . . many eggs were frozen and dead bluebirds and tree swallows were found in the nestboxes."- On several lines all eggs laid were frozen. In the Fort Ellice area Cliff Findlay examined 41 boxes 19 May 1983. Of these, 31 had been occupied by bluebirds. He found 58 frozen eggs and one dead female Mountain Bluebird.

When the Mountain Bluebirds began to renest they were in direct competition for boxes with the Tree Swallows and had lost the advantage that they usually have in earlier nesting. In the Fort Ellice area, of the 31 boxes that had been occupied by bluebirds 13 were taken over by Tree Swallows. On another line that had eight Mountain Bluebird nests before the storm, only half were retained by renesting Mountain Bluebirds. Because of this late start on the first successful nesting, there appear to have been fewer completed second nestings as well.

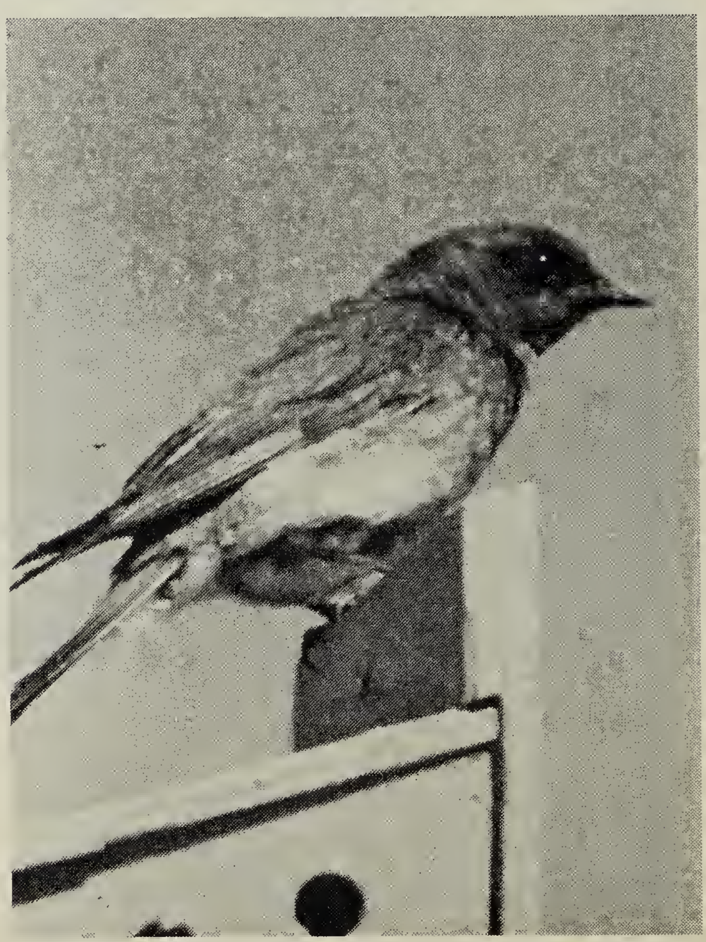
Although the storm was hardest on the Mountain Bluebirds as they were the only ones that had begun to lay, other species probably suffered considerable losses. Three dead Eastern Bluebirds and one dead Tree Swallow were found near Hartney by J.B. Thomas 15 May 1983. Nine dead Tree Swallows were found packed into a single nest box after the storm by Grace Terry at Rapid City. The area east of Brandon, while it showed some storm-related disasters, appears to have been affected to a much lesser degree.

Despite the storm we have an increase in Eastern Bluebird nestings again this year; double that of two years ago. Eastern Bluebirds return later than Mountain Bluebirds and the majority of them may have missed the storm. There was also an increase in Tree Swallows and House Wrens.

New boxes have been supplied again by Raymond Gladden (500 boxes), John Plum (43 boxes), Harold Kneeshaw (66 boxes) and the Neepawa Boy Scouts (50 boxes), so that we have a good supply on hand for the spring. The majority of these boxes are now being made with removable bottoms and 9/16 in. entrance hole.

In addition to local activities, three members attended and greatly enjoyed the program of the Western Regional Meeting of the North American Bluebird Society at Portland, Oregon, in June 1983. A special thrill was seeing the Western Bluebird.

Ann Smith assumed the chairmanship of the Co-ordinating Committee in the fall of 1983. All correspondence should now be addressed to her.



Male Eastern Bluebird — J. Lane.

WESTERN GREBE — ONE SPECIES OR TWO?

MARY GILLILAND, 902 University Drive, Saskatoon, Saskatchewan. S7N 0K1

The summary of highest counts of individual species in 1982 Christmas Bird Counts across North America included under Western Grebe a separate entry for 31 W. (Clark's) Grebe in California and a comment on the first-time appearance in this journal for what will "likely prove to be a distinct species."[7] Just prior to this, Harrison had called attention to the Western Grebe also, stating that it has "two subspecies ... which may prove to be good species."[5] Most recently, the latest edition of the American Ornithologists' Union (AOU) Check-List added a special note to Western Grebe, mentioning 2 colour morphs which may represent distinct species and, if so, will be called Western Grebe (*Aechmophorus occidentalis*) [dark-phase] and "Clark's Grebe" (*Aechmophorus clarkii*) [light-phase] (See Figure 1)!

The status of the 2 color phases has been debated for well over 100 years, but in none of its previous 5 editions from 1886 to 1957 did the AOU Check-List indicate that they may represent 2 species. Nor do the 2 varieties appear to have been illustrated together in field guides prior to 1980. Peterson in 1961 mentioned 2 head patterns but showed only light-phase, without naming it.[10] Three current guides show both colour phases: Peterson without comment, Scott with light- and dark-phase downy young and Farrand using the name Clark's Grebe and commenting on biological separation and possibly reclassification.[11] [14] [4]

Distinct colour differences, do not always turn out to represent a species difference. Many single species have 2 or more adult, non-seasonal, non-sexual colour forms, including several

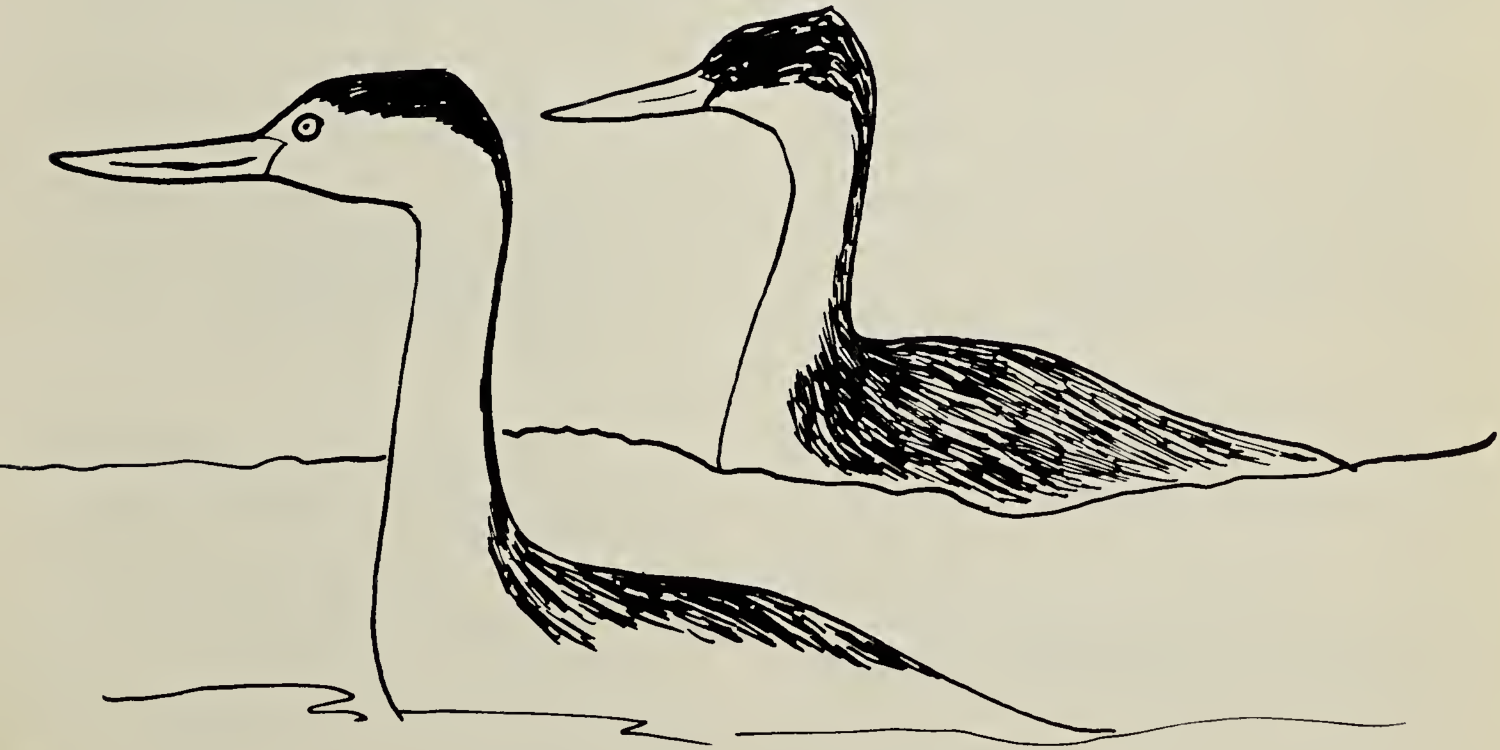


Figure 1. *Western Grebe Colour Phases. Left, light-phase. Right, dark-phase. Drawing by Mary Gilliland.*

buteos, falcons and sparrows, the Snow Goose and the Eastern Screech-Owl. Nor does lack of apparent colour and pattern differences always result in classification of 2 or more groups as one species. Some species resemble each other so closely physically — meadowlarks and Empidonax flycatchers, for example — that vocalizations become the main basis for more positive identification.

The critical factor in all cases is whether the groups in question do, or have the potential to, successfully interbreed on a large scale in the wild. If not, they are considered separate species. Occasional interbreeding is not by itself likely to change this assessment.

Field Characteristics

The Western Grebe is the largest North American grebe. The 2 colour phases have distinct differences in bill colour, extent of dark feathers on the head and neck, and darkness or lightness or dorsal and flank plumage. Rare intermediate forms do occur, in which the black crown colour bisects the eye and the flanks and back are not so uniformly dark.[4] Colour differences are itemized in Table 1.

Ratti's study found the sole significant size variant to be culmen length in females: light-phase birds averaged 3 mm shorter than dark-phase.[12] He did note a possibly significant general trend toward smaller light-phase measurements. Most current references do not differentiate between light- and dark-phase in physical measurements. Males of both phases are generally larger with thicker and longer bills.[9]

Ratti studied downy young of both forms in Utah and confirmed the early appearance of colour differences.[12] Dark-phase chicks began acquiring black crowns much sooner than light-phase young — at 10-15 days instead of 50-60 for the latter group. By 45 days dark-phase chicks had black crowns. Dorsal and flank plumage followed the

Table 1. FIELD CHARACTERISTICS OF LIGHT- AND DARK-PHASE WESTERN GREBE

Light-Phase	*Feature*	*Dark-phase*
Crown colour does not reach eyes, lores or mouth area.[15] Lores are white.[4]	*Facial Colour*	Black crown colour extends below eyes, which are surrounded by black feathers.[4] Lores gray to black.
Orange-yellow with top of upper mandible black.[15]	*Bill Colour*	Dull greenish-yellow with top of upper mandible black.[15]
Paler gray flanks and back speckled with white feathers.[4]	*Flank and Dorsal Plumage*	Uniformly dark gray to black.[4]
Narrower[15]	*Black Nape Stripe*	Wider[15]
About 22 in.[13]	*Body Length*	24-29 in.[13]

same trend and light-phase chicks still appeared white by comparison to dark-phase until about 50 days. Lindvall and Low in the same area reported similar trends but reduced the time at which both groups resembled the respective adult phase to 25-35 days.[6]

Distribution

The Western Grebe breeds from southern British Columbia to south-central Mexico on the Pacific Coast, and inland to Manitoba, Minnesota and Iowa.[4] It is casual to rare in the East. Wintering populations occur on the Pacific Coast through the summer range and in the Mexican interior, utah, New Mexico, Colorado and Texas.[1]

Available data on colour phase distribution clearly indicate a clinal component. Dark-phase dominates in the north and light-phase increases toward the south. Almost all eastern records are dark-phase.[14] Storer reported Canadian populations to be almost completely dark-phase.[15] Those of the Dakotas were similar to Saskatchewan's at approximately 1% light-phase; Utah's light-phase population of about 12% was similar to those of California and Oregon. Some Mexican populations neared 100% light-phase.[2] Discovery of local variations in these general proportions has not finally changed acceptance of the basic underlying geographic component of colour phase distribution.

Behaviour

Research has revealed a strong tendency toward preferential mating of like colour phases. Storer's observations of 127 pairs showed a notable disparity between the number of mixed pairs actually present and that to be expected if mating were random for colour phase: 4 present and 30 expected.[15] Ratti's combined data in his 3-year Utah study indicated colour-mixed pairs occurred at only about 2% of the expected random frequency — 3 present and 140 expected.[12] His field investigations in other states produced similar results. Nero's earlier Saskatchewan study, in which 5 of 500 Western Grebes were light-phase, indicated 2 of the 5 were mated to each other.[15] This could be expected less than once in 10,000 cases if mating were random. Manitoba's statistics for total light-phase and for mixed pairs resembled Saskatchewan's.[8]

Discussion

Three possibilities seem to exist for future classification of variants of Western Grebe. First, there is considerable basis for raising the light phase to full species status as Clark's Grebe. The 2 colour phases are almost totally isolated reproductively. Spatial segregation and differences observed in morphology, nest initiation dates, mean brood size and development of chicks support such a division.[12] Intermediate plumages may well be immatures and adults in non-breeding state. In breeding populations researchers found only rare intermediate forms and of these none was intermediate in either bill colour or in advertising call.[8] This initial contact between unpaired birds of opposite sex appears to differ consistently between the two phases. Light phase birds have a single note, dark phase birds a two note call.

When interbreeding does occasionally occur it appears to be successful.[8] Ratti gives interbreeding statistics for colour phases of Snow Goose — 50% of the frequency expected — and Parasitic Jaeger at 87%.[12] His data on mixed pairs of Western Grebe showed them to be 1.2% of nesting pairs and only 0.26% of pairs with broods. Broods of mixed colour phase were 0.5% of the total in his study group (4 of

766) and could well result from egg dumping or brood mixing. He surmises that interbreeding at such a low level may actually be strengthening reproductive isolation of the 2 phases.

A second option for which some support exists is based on studies by Dickerman and others in Mexico.[2],[3] Dickerman found sufficient combinations of colour and size variables to warrant suggesting the smaller *clarkii* as a subspecies including both colour phases. If the 2 colour phases were to be considered full species, new subspecific names would have to be added for large pale birds and small dark birds.[16]

The third possibility is continuation of Western Grebe as one species with 2 colour phases. Researchers unwilling to yet change this classification recommend further investigation in all regions, particularly on populations in Mexico. More research is also needed on Canadian populations.

Whether Western Grebe remains one species or becomes two, it presents a unique case. Ratti, in supporting division, says, "if dark- and light-phase grebes are morphs, they represent a unique biological phenomenon. Examinations of the literature on avian systematics indicates that no other broadly sympatric avaian polymorphic species is known to exhibit such a low incidence of interbreeding."[12] Nuechterlein, believing the question of species separation still open, also sees unique aspects: "I know of no other instance in which males of two separate species regularly engage in *mutual* display to attract females."[8]

For the moment Western Grebe remains a genus of one species with 2 colour phases. Researchers in Canada, the United States and Mexico are continuing to identify and investigate gaps in data and trying to arrive at the most accurate description of the relationship between its light and dark phases through examination of physical characteristics, vocalizations, general behaviour and habitat selection. For now the dilemma remains.

Role of the Amateur

It is certain that skilled amateurs can become involved by examining thoroughly those populations of Western Grebe which they encounter, by making careful notes on their observations and by publishing them or making them available to provincial museums. Local naturalists are clearly in a position to contribute to current research, since the Western Grebe breeds across the southern parts of the Prairie Provinces.

Blue Jay readers with observations on ratios of dark phase Western Grebe to "Clark's" Grebe in areas they visit in 1984 are invited to send their findings to the author.

[1] AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-List of North American birds. Sixth Ed. American Ornithologists' Union, Lawrence, Kansas.

[2] DICKERMAN, R.W. 1963. The grebe *Aechmophorus occidentalis clarkii* as a nesting bird of the Mexican plateau. Condor 65:66-67.

[3] DICKERMAN, R.W. 1973. Further notes on the Western Grebe in Mexico. Condor 75:131-132.

[4] FARRAND, JOHN, Jr. 1983. The Audubon Society master guide to birding. Vol. 1. Alfred A. Knopf, New York.

[5] HARRISON, PETER. 1983. Seabirds. An identification guide. Houghton Mifflin, Boston.

[6] LINDVALL, M.L. and JESSOP, B. LOW. 1982. Nesting ecology and production of Western Grebes at Bear River Migratory Bird Refuge, Utah. Condor 84:66-70.

[7]MONROE, B.L., Jr. 1983. Summary of highest counts of individuals for Canada and the U.S. American Birds 37:793.

[8]NUECHTERLEIN, G.L. 1981. Courtship behavior and reproductive isolation between Western Grebe color morphs. Auk 98:335-349.

[9]NUECHTERLEIN, G.L. 1981. Variations and multiple functions of the advertising display of Western Grebes. Behaviour 76:289-317.

[10]PETERSON, R.T. 1961. A field guide to western birds. Houghton Mifflin, Boston.

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[12]RATTI, J.T. 1979. Reproductive separation and isolating mechanisms between sympatric dark- and light-phase Western Grebes. Auk 96:573-586.

[13]RIDGWAY, ROBERT. 1896. A manual of North American birds. J.B. Lippincott, Philadelphia.

[14]SCOTT, S.L. 1983. Field guide to the birds of North America. National Geographic Society, Washington, D.C.

[15]STORER, R.W. 1965. The color phases of the Western Grebe. Living Bird 4:59-63.

[16]WILLIAMS, S.O., III. 1982. Notes on the breeding and occurrence of Western Grebes on the Mexican plateau. Condor 84:127-130.

Western Grebes (dark-phase) *Sheina Wait*

A WINTERING CHIPPING SPARROW AT PINAWA, MANITOBA

PETER TAYLOR, Box 597, Pinawa, Manitoba. R0E 1L0

On 16 January 1983, Reto and Marg Zach observed a small sparrow at their bird feeder in Pinawa. All three of us studied the bird at length later that afternoon, and concluded that it was an immature Chipping Sparrow. Since this is apparently the first documented winter record of the species in Manitoba, and since the somewhat hardier Tree Sparrow is frequently misidentified as the Chipping Sparrow, a summary of my field notes is given here.

The bird was a plump, chickadee-sized sparrow, which usually foraged in a horizontal posture. It closely resembled the illustration of an immature Chipping Sparrow (Plate 67: 7b) in Godfrey.[3] The head was brown (not reddish), with a fairly broad buffy stripe over the eye, and a less prominent median stripe on the crown. There was some broken streaking on the remainder of the crown. The bill was pinkish, except the tips of both mandibles and the dorsal surface of the upper mandible, which were dark. There were two narrow, whitish bars on each wing. The breast, belly, rump and sides of the neck were all unmarked gray (the gray rump is diagnostic for this species). The throat was whitish, with indistinct, dusky moustachial stripes. Leg colour was not recorded. The call note, a fairly sharp "chip", was uttered frequently. It lacked the bell-like quality of a Tree Sparrow call, but was not as "dry" as a Clay-colored Sparrow call.

This Chipping Sparrow remained in Pinawa throughout the winter, irregularly visiting several feeders. Undoubtedly, it benefitted greatly from an abundant supply of artificial food, and from the unusually mild winter. I last saw it, apparently in good health, on 22 March. Unfortunately, no satisfactory photographs were obtained, because of its irregular habits. Rudolf Koes and Norman Cleveland saw it briefly on 26 February, confirming that it was a small *Spizella* sparrow, but could not approach it closely enough for full identification.

Chipping Sparrows are normally present in southeastern Manitoba from May to September.[1] [6] There is one late fall record, an individual seen at Patricia Beach, Lake Winnipeg, on 4 November 1980 by Martin G. Siepman (pers. comm.). The normal winter range includes much of the southern United States, extending north along the east coast to extreme southern New England.[3] [5] Godfrey describes this species as "occasional in winter in Nova Scotia and southern Ontario".[3] So far as I am aware, the nearest winter record to Manitoba is of a bird which spent the 1980-81 season at Crosby, Minnesota, about 400 km south-southeast of Pinawa.[2] A report of 15 Chipping Sparrows in the 1969 Pinawa Christmas Count is undoubtedly erroneous.[4] These birds were most likely House Sparrows or redpolls, since so large a number, even of the hardier Tree Sparrow, is highly unlikely.

I am grateful to Rudolf F. Koes and Reto Zach for encouragement and helpful comments on this note.

[1]CLEAVELAND, N.J., C.W. CUTHBERT, G.D. GRIEEF, G.E. HOLLAND, P.A.

HORCH, R.W. KNAPTON, R.F. KOES, N.F. MURDOCH, W.P. NEILY and I.A. WARD. 1980. Birder's guide to southeastern Manitoba. Eco Series No. 1, Manitoba Naturalists Society, Winnipeg. 58 pp.

[2] ECKERT, K.E. 1981. The winter season: Western Great Lakes Region. Am. Birds 35:303.

[3] GODFREY, W.E. 1966. The birds of Canada. Natl. Mus. Can. Bull. No. 203, Biol. Series No. 73. Ottawa. 428 pp.

[4] HOLLIES, R. 1970. Seventieth Christmas Bird Count. 62. Pinawa, Man. Audubon Field Notes 24:121.

[5] PETERSON, R.T. 1980. A field guide to the birds of Eastern and Central North America. Houghton Mifflin, Boston. 384 pp.

[6] TAYLOR, P. 1983. Wings along the Winnipeg: the birds of the Pinawa-Lac du Bonnet region, Manitoba. Eco Series No. 2, Manitoba Naturalists Society, Winnipeg. 218 pp.

EDITOR'S NOTE: A single Chipping Sparrow was reported at a feeder in Indian Head, Saskatchewan during December, 1981 by Mary Skinner. (See *Am. Birds* 36:305 and *Blue Jay* 40:29).

WILLOW PTARMIGAN — 1982 CBC

An additional species should have appeared in the table for species reported from fewer than three localities in the 1982 - 1983 CBC report last March. The Squaw Rapids count on 24 December 1982 recorded 7 Willow Ptarmigan.

KAMSACK CBC — 1983

DATE: December 21

WEATHER: Temperature -40° to -45°; wind 25-30. Snow depth 18 cm. Clear.

COVERAGE: Observations at feeders.

SPECIES: Gray Partridge, 23; Black-billed Magpie, 9; Common Raven, 7; Black-capped Chickadee, 16; Dark-eyed Junco, 7; Snow Bunting, 40; Pine Grosbeak, 12; Evening Grosbeak, 50; House Sparrow, 100.

TOTALS: 9 species; 264 individuals.

OBSERVER: Isabel Ritchie

EDITOR'S NOTE: This count arrived too late to be included in the tables.

SNOW BATHING IN JANUARY.

DONALD F. HOOPER, Box 40, Somme, Saskatchewan. S0E 1N0

While in Porcupine Plain on 2 January, I was looking around town for additional species for the "Christmas Bird Count". It was the mildest day in over four weeks. At noon the temperature was -4° celsius, a real relief from the unusually cold December that we had experienced.

Across from the grain elevators I noticed that House Sparrows were flocking together, and funnelling down into a vacant lot (like ducks coming into a grain field). I drove up closer, my curiosity much aroused. When I got a look at the situation with my binoculars, I could see that they were not coming in to feed, but to bath in the snow.

There were two forty-five gallon drums turned upside down with about four inches of fluffy snow on top. Ten to twelve birds were on each barrel, enthusiastically dusting themselves with the powdery snow. Their wings were all fluttering at once, and the snow was really flying into the air. As each bird finished its bath, it had worked its way down into the snow, until only its head was sticking out. The whole bath lasted only about a minute. As each bird flew away, it was replaced by a new arrival. There were flocks of House Sparrows coming from every direction. The call of the bathing birds must have been, "come on in, the snow is fine!"

One wonders why they were snow-bathing with such fervor. Perhaps the birds were lousy, and December was much too cold for bathing. The nights were long, and the lice would greatly increase, as many hours were spent perching together under the eaves of buildings, in old sheds, or in the elevators. Or maybe they were glad to get rid of some of the elevator dust. A good cleaning would not doubt improve their health. (Could it be that these birds, like the elevator agents, even contact such dust problems as the type of Emphysema called "Farmer's Lung").

Whatever the reason, the weather was warm enough for the birds to get into the mood to snow bathe. If the snow was melting it would be too wet. Also the snow was just the right depth, on top of the barrels, as undisturbed snow on the ground was about ten inches deep.

It is also interesting to note that about the same time that day, a Boreal Chickadee near Somme, was seen to leave the feeder, and flop into the snow, to dust itself.

PRAIRIE NEST RECORD CARD SCHEME

An increase of participants interested in locating and recording information on the progress of nesting birds from many more areas of Alberta, Manitoba, Saskatchewan, and the Northwest Territories are needed.

Information obtained is of benefit to graduate students, government biologists, and other researchers in their studies of birds. For example: at present, nest record cards for Saskatchewan from the Prairie Nest Record Card Scheme files are being checked by a group of people in Saskatchewan who are compiling information on distribution and breeding of Saskatchewan bird species. Therefore during the next two years it would be very helpful to have many more people contributing information on the nesting birds from all areas of Saskatchewan.

Blank nest record cards, instructions and a copy of the 1983 nesting season report can be obtained by writing:

H.W.R. Copland
Prairie Nest Record Card Scheme
Manitoba Museum of Man & Nature
190 Rupert Ave.
Winnipeg, Manitoba, R3B 0N2.

SASKATCHEWAN CHRISTMAS MAMMAL COUNT — 1983

Compiled by WAYNE C. HARRIS, Box 414, Raymore, Saskatchewan. S0A 3J0

A total of 55 counts were received this year reporting 32 species during the count period. The number of counts exceeds the previous high of 49 in 1982 and the number of species exceeds the high of 28 recorded in 1978, 1980 and 1982. These new high totals are in spite of the particularly harsh weather during this count period.

Although no new species were added to the Christmas mammal count list there were four species seen only once in the past ten years. These were the Fisher at Prince Albert National Park, Fox Squirrel at Regina, Gray Squirrels at Saskatoon and Northern Flying Squirrel at Good Spirit Lake.

Populations are similar to last year. Lynx were not reported. Only White-tailed Jack Rabbit and Snowshoe Hare show declines over last year. The apparent decline in Red Squirrels may be due to the extremely cold weather rather than a real decrease in population.

The only species for which a noticeable increase occurred is Nuttall's Cottontail, for which more than usual were seen and over a greater range. Is it a coincidence that cottontail numbers seemingly are increasing while hare population decline? Do cottontail populations peak when hares are at their low?

In spite of the cold weather during much of the count period both Striped Skunks and Badgers were active. Is this normal, regardless of weather?

For weather, coverage and participants on these counts please refer to the Christmas Bird Counts found elsewhere in this issue. Symbols found in the table are as follows:

*	Identified by tracks with estimated number of individuals in parentheses
+	Seen during count period but not on count day
L	Active lodges or huts seen with number in parentheses
H	Species heard but not seen with number in parentheses
S	Presence indicated by odor with number in parentheses
D	Fresh diggings seen
d	Freshly dead animal seen

Porcupine *G.J. Smith*

Table 1-1. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

SPECIES / LOCALITY	ASSINIBOIA January 3	BANGOR December 24	BIGGAR December 22	BIG GULLY CREEK December 29	BIRCH HILLS December 19	BRIGHTWATER RESERVOIR December 18	BROADVIEW December 28	CROOKED LAKE December 26	DUCK MOUNTAIN PARK January 2	DUVAL December 29	EASTEND December 26
SHREW species				*			*(12)	*(2)			
RACOON	2										
RED FOX	3			*	*(2)	*(1)				*(2)	
COYOTE				3	1		*(4)	*(2)	*(1)	*(3)	
TIMBER WOLF											
FISHER											
ERMINE	1				*(1)		*(4)				
LEAST WEASEL											
LONG-TAILED WEASEL				1			*(4)	*(2)		*(6)	
WEASEL species				*	*(1)			*(2)	*(3)	*(9)	
MINK				*		*(1)			*(1)		
RIVER OTTER											
STRIPED SKUNK	4									*(1)	
BADGER	2			D(1)							
WHITE-TAILED JACKRABBIT	16			2	*(4)	1	*(2)	*(5)		*(14)	6
SNOWSHOE HARE	6		1	1	*(11)		*(44)	*(10)	*(6)	1	
NUTTALL'S COTTONTAIL											
FOX SQUIRREL											
RED SQUIRREL				4	2		*(10)	6	1		
GRAY SQUIRREL											
N. FLYING SQUIRREL											
BEAVER				L		L			L(4)		
DEER MOUSE											
MEADOW VOLE											
MOUSE species					*(3)	*(5)	*(7)	*(3)	*(12)	*(29)	
MUSKRAT				L							
NORWAY RAT										*(2)	
HOUSE MOUSE											
PORCUPINE			2	2				1			
ELK											
MULE DEER			+	7							28
WHITE-TAILED DEER	15	9	*(10)	3	*(7)		*(18)	*(5)	*(5)	*(3)	13
DEER species						d(1)					
MOOSE									*(2)		
PRONGHORN											
TOTAL SPECIES	8	1	4	14	8	6	10	9	9	9	3

Table 1-2. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

ENDEAVOUR January 2	FORT QU'APPELLE December 31	FORT WALSH December 17	GARDINER DAM December 19	GLAMIS - WISETON December 29	GOOD SPIRIT LAKE December 28	GOVENLOCK December 18	GREENWATER LAKE January 1	HUMBOLDT December 26	INDIAN HEAD December 27	KELVINGTON January 1	LOCALITY SPECIES
				*(1)	*(1)						SHREW species
											RACOON
						3		*(1)	2		RED FOX
*(3)	1	2	1	*(2)	*(1)	4		*(1)	14		COYOTE
											TIMBER WOLF
											FISHER
											ERMINE
*				*(2)				*(2)			LEAST WEASEL
				*(2)					3		LONG-TAILED WEASEL
	*(1)	*(2)	*(1)		*(8)	*					WEASEL species
1	1			*(1)					1		MINK
											RIVER OTTER
											STRIPED SKUNK
						D(1)					BADGER
1		6	5	+	*(5)	7		*(3)	5		WHITE-TAILED JACKRABBIT
*	+			+	*(8)			*(12)			SNOWSHOE HARE
		3	1			4			1		NUTTALL'S COTTONTAIL
											FOX SQUIRREL
1	7	22			*(1)	H(1)		*(2)	6	1	RED SQUIRREL
											GRAY SQUIRREL
					2						N. FLYING SQUIRREL
					L(1)						BEAVER
	+										DEER MOUSE
	*(1)			*							MEADOW VOLE
		*(2)	*(1)	*	*(6)				*(7)		MOUSE species
											MUSKRAT
											NORWAY RAT
	1										HOUSE MOUSE
	+	2	1		1	2		+			PORCUPINE
*(2)		*(5)					*(6)				ELK
		9	30	+		28					MULE DEER
*(4)	*	39	3		1	2	*(5)	*(10)	36		WHITE-TAILED DEER
											DEER species
*(1)		3					*(2)				MOOSE
		1				343					PRONGHORN
9	10	12	8	10	11	10	4	8	9	1	TOTAL SPECIES

Table 1-3. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

SPECIES / LOCALITY	KENASTON December 30	KUTAWAGAN LAKE December 21	LA RONGE December 26	LAST MOUNTAIN LAKE January 2	LEADER January 2	LOON LAKE December 28	LOVE - TORCH RIVER December 31	MAIDSTONE BRIDGE December 28	MELFORT December 29	MOOSE JAW January 2	NIPAWIN December 18
SHREW species											
RACOON											
RED FOX	*(15)	1	*(1)	*			*(1)	*		3	
COYOTE	*(1)	2		2	2	1	*(10)	2		3	*(5)
TIMBER WOLF											
FISHER											
ERMINE											
LEAST WEASEL	*(1)										
LONG-TAILED WEASEL	*(2)									*(1)	
WEASEL species		*	*(4)	*				*			
MINK			*(1)							*(4)	
RIVER OTTER											
STRIPED SKUNK								+		S(1)	
BADGER				D(1)							
WHITE-TAILED JACKRABBIT	*(10)	2		1	2			1		*(4)	*(7)
SNOWSHOE HARE			*(8)	*		*(2)		1	2	*(11)	*(1)
NUTTALL'S COTTONTAIL	+									*(1)	
FOX SQUIRREL											
RED SQUIRREL			2			1		2			
GRAY SQUIRREL											
N. FLYING SQUIRREL											
BEAVER				L(1)				L			
DEER MOUSE											
MEADOW VOLE		1	*(11)								
MOUSE species	*	*		*				*		1	
MUSKRAT		L		L(40)				L			
NORWAY RAT											
HOUSE MOUSE											
PORCUPINE	*(2)	*		*				1			
ELK											
MULE DEER					6	3					
WHITE-TAILED DEER	*(1)		*(2)		3	3	*(24)	4		5	*(5)
DEER species		*		*							
MOOSE						12					
PRONGHORN											
TOTAL SPECIES	9	8	7	11	4	4	5	12	1	10	4

Table 1-4. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

NUT MOUNTAIN December 26	PELICAN NARROWS December 26	PIKE LAKE January 2	PRINCE ALBERT January 2	P.A. NATIONAL PARK December 17	RAYMORE December 20	REGINA December 31	ROUND LAKE January 2	ST. WALBURG December 26	SASKATOON December 26	SCOTT December 31	LOCALITY SPECIES
					*	*(1)					SHREW species
											RACOON
*(3)	+		2	5	*	1	*(6)	1			RED FOX
*(1)		H(2)	H		2		*(12)	2	2	1	COYOTE
	+			2							TIMBER WOLF
				*(1)							FISHER
						*(3)	*(12)				ERMINE
						*(1)	*(5)				LEAST WEASEL
*(1)					1	*(7)	*(18)	1			LONG-TAILED WEASEL
	*(1)	*(2)			1				1		WEASEL species
	+			*(1)	*		*(6)				MINK
											RIVER OTTER
					+						STRIPED SKUNK
					+						BADGER
		*(1)			6	14	*(1)		4	1	WHITE-TAILED JACKRABBIT
*(2)	*(3)	4		*(3)	3		2	*(5)	3		SNOWSHOE HARE
											NUTTALL'S COTTONTAIL
						+					FOX SQUIRREL
	2	1		2	2		3				RED SQUIRREL
									2		GRAY SQUIRREL
											N. FLYING SQUIRREL
L(1)					L(1)						BEAVER
					2						DEER MOUSE
	+				1	*					MEADOW VOLE
	+	*(19)		*(1)		*	*		*	*(2)	MOUSE species
L(6)	*(1)				L(7)				1		MUSKRAT
					*						NORWAY RAT
					1						HOUSE MOUSE
		1			3	*(1)	4		1		PORCUPINE
				33							ELK
		*(5)									MULE DEER
+				1	5		*(12)	*(3)	2		WHITE-TAILED DEER
		*(5)									DEER species
				*(1)				*(2)			MOOSE
											PRONGHORN
7	8	8	2	10	18	8	12	6	9	3	TOTAL SPECIES

Table 1-5. SASKATCHEWAN CHRISTMAS MAMMAL COUNTS

SPECIES / LOCALITY	SKULL CREEK January 3	SPRING VALLEY January 2	SQUAW RAPIDS December 24	SWIFT CURRENT December 17	TISDALE December 29	TONKIN December 31	WAUCHOPE December 26	WHITEBEECH January 1	WHITE BEAR January 1	WOLSELEY SOUTH January 1	YORKTON December 31	TOTAL NUMBER OF COUNTS PER SPECIES OR GROUP
SHREW species												6
RACOON												1
RED FOX		* (3)					* (1)				* (1)	26
COYOTE	* (6)	2	2	2	* (3)			* (1)	11	1	* (1)	41
TIMBER WOLF			*					* (3)				4
FISHER												1
ERMINE												5
LEAST WEASEL		* (1)										7
LONG-TAILED WEASEL		* (1)										14
WEASEL species				* (1)			* (3)	+				21
MINK		* (2)	1			* (3)					* (1)	17
RIVER OTTER			*									1
STRIPED SKUNK												5
BADGER									* (1)			6
WHITE-TAILED JACKRABBIT	*	2		5	* (10)	* (3)		*	3	1	* (5)	38
SNOWSHOE HARE								*			* (21)	30
NUTTALL'S COTTONTAIL	1			* (2)					1			9
FOX SQUIRREL												1
RED SQUIRREL			6					+				23
GRAY SQUIRREL												1
N. FLYING SQUIRREL												1
BEAVER			L									9
DEER MOUSE							* (3)					3
MEADOW VOLE	*											7
MOUSE species				* (5)		* (20)		* (1)			* (10)	27
MUSKRAT		* (1)										9
NORWAY RAT												2
HOUSE MOUSE												2
PORCUPINE			1				1		1	3		22
ELK			*					* (2)				6
MULE DEER	+	* (3)		8					72			15
WHITE-TAILED DEER	12	* (2)	1		* (4)	* (3)	21	* (8)	3			41
DEER species												4
MOOSE			*					* (2)				9
PRONGHORN	+											3
TOTAL SPECIES	7	9	10	6	3	4	5	10	7	3	6	

NATURE LIBRARY

FIELD CHECKLIST OF SASKATCHEWAN BIRDS

ROBERT KREBA. 1983. Museum of Natural History, Saskatchewan Culture and Recreation, Regina. 4 for $1.00

This, the 6th edition of the Saskatchewan check-list, continues a series begun in 1947, and published under the auspices of the Saskatchewan Museum of Natural History since the 2nd edition in 1954. On good card stock, it measures 17.5 by 10 cm, after being folded in three. The provincial list of fully accepted species, which totalled only 265 when compiled by H.H. Mitchell in 1924 (Can. Field-Nat. 31: 101-118) rose to 297 in 1954, 325 in 1969 and now 336 species in 1983. The total of hypothetical species has increased from Mitchell's 29 to the present 38.

The number of bird species does not show signs of reaching a plateau or saturation point, but continues to increase at almost a steady rate. This is a reflection of a continent-wide phenomenon. Birders are out in increased numbers. They are armed with more sophisticated guides and better binoculars, telescopes and cameras, and they range farther afield for more days of the year. Some species met with on a chance basis, and thought to be irregular stragglers, are now appreciated to be predictable and regular visitors. When a truly haphazard straggler does appear, it has a greater chance of being spotted by an experienced birder.

There are important changes from previous lists. Most useful is the provision of breeding status with notation of "B" for 241 proven breeding species, of "b" for 14 species suspected but not proven to breed, and of "(B)" for 8 species formerly known to breed. The 38 hypothetical species are in the appendix, no longer scattered through the text in their regular sequence within parentheses, as was done in previous editions.

Any compiler of such a list is plagued with grey-area judgement calls. Especially difficult to assess are unpublished word-of-mouth reports, use of which causes a potentially confusing discrepancy with what has been in print. For example, David Hatch's photograph of the European Wigeon has not yet been published. The Screech Owl is listed as a verified breeding species on the basis of the young owl "extricated from a chimney in Moose Jaw" in August 1979, without any details as to its powers of flight or where its nest might have been (Belcher 1980). One might presume that this owl either had been raised in the chimney or that it had some flight capability, but Kreba tells us that he saw the bird in the Moose Jaw Zoo the next day, when it was unable to fly. (Although territorial individuals have been present in the Qu'Appelle and its tributaries, such as at Hidden Valley near Regina, each year since, breeding attempts there apparently have not yet been documented). More straightforward is the Poor-will, for which the first Saskatchewan nest was found in 1983 near Fort Walsh. We hope full details of this will be published soon.

One species (Townsend's Warbler) is in the interesting position of having a breeding record (adults feeding flightless young) and yet the species, without any identifiable photograph or specimen, is relegated to the hypothetical list. In contrast, the difficulty of handling published information is exemplified by Kreba's allocation of full status to the Black-necked Stilt, on the basis of a set of eggs collected at Qu'Appelle in 1894 by Edward Arnold, apparently without seeing the parent birds. Godfrey (Auk 86: 562-563) has declared this record to be "not acceptable" because of the possibility that the eggs were merely small eggs of the American Avocet. Kreba tells us that the 1977 nest record of the stilt in Alberta has caused Godfrey to reconsider the acceptability of the Qu'Appelle record, but such a change in opinion is not yet in print. Even if accepted, the situation is similar to that of Townsend's Warbler, a breeding record of an undocumented species. The Indigo Bunting is listed as a documented breeding species, although the breeding record is for a male Indigo mated to a female Lazuli Bunting. There are two species, Great Egret and White-breasted Nuthatch, listed as suspected but not proven to breed for which there is published breeding evidence.

Proof that such a list is never static is evident from the additions during and since its publishing. Hypothetical Bar-tailed Godwit and Great Black-backed Gull sightings were published while the list was in preparation. Recognizable photographs of Barrow's Goldeneye taken since publication will now elevate this species to the fully accepted list, and a photograph of the King Elder will place this new species on the full list. We have also learned of the sighting of a Common Eider at Midwest Lake by Martin McNicholl in 1979 and expect publication of this record.

Although the interval between the 5th and 6th editions of the Saskatchewan list, 14 years, is much the longest to date, the delay has allowed use of the terminology of the newly-published 6th AOU list. There is one exception: Kreba uses "Northern Raven," whereas the ABA and the 5th and 6th AOU lists all use "Common Raven." Although if the choice were mine, I would vote with Kreba for "Northern" rather than "Common," ("common" being used in the old English sense of "ordinary" without any implication of numerical abundance). However, there can be only one standard for North America and it is the AOU list. With this exception, the new Saskatchewan list is an extremely handy reference for the new AOU names and sequence. It offers an up-to-date reference list for accepted, hypothetical and breeding species, and is a handy card for recording of sightings in the field.

Every Saskatchewan birder needs a packet of these cards, and ornithologists in neighboring jurisdictions need at least one. Kreba is to be congratulated on a job well done. — Reviewed by *C. Stuart Houston*, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8

LORDS OF THE HIGH ARCTIC, A Journey Among the Polar Bears

RICHARD C. DAVIDS. 1982. Macmillan Publishing Co., Inc. New York. 140 pp. 90 color photos, hard cover, 7" x 10", $29.95.

Richard Davids, author, and photographer Dan Guravitch, Ph.D., have given us a book of unexcelled beauty. The prose is clear and informative; the photographs are splendid. Author and photographer have been watching polar bears in the wild for five years, spending long periods in their habitat in the Arctic, from Churchill to the

Beaufort and Chukchi seas, from Baffin Island in the east to Barrow in the west, in Alaska, on Admiralty Island, on the north and west borders of Hudson Bay, and at Coral Harbour. They spent long hours in the field with biologists studying polar bears, with Canadian and Alaskan Eskimos, and with various Europeans living in the region. The author demonstrates a sound familiarity with the literature, listing 138 sources for "Further Reading."

The foreword is written by Dr. Ian Stirling, a prominent authority specializing in the study of the population, ecology and behavior of polar bears.

The book is easy reading, humorous, thoughtful, and intimate. The author leads the reader gently into the world of the polar bear, describing the quest undertaken by himself and the photographer to understand better the nature of this large carnivore, by observing and photographing bears in all seasons and in all moods. It is a highly popular account, but it describes many actual events with the keen gusto of a first class naturalist-writer. "The ice of the ocean," says the author, "is their hunting platform, their home of sweet content. Away from it, they are restless and nervous." There is little doubt that Davids, who lives in Minnesota, found the land of the polar bear attractive. He writes: "The arctic is a beautiful, haunting land. The skies are often intensely blue, the snow so white that the horizon is a firm line that separates ice and sky as if a child had drawn it." His powers of observation are applied equally well to the polar bear: "A bear stalks a resting seal only rarely, but when he does it is a memorable sight. He moves forward behind any hummock or chunk of ice, zigzagging his way; in the open he flattens himself like a rug, neck and snout on the ice, snaking forward propelled by slow pushing with his hind feet, stopping dead when the seal lifts its head. The moment comes when the bear knows he is detected, or perhaps he can no longer restrain himself. In a few giant leaps he is on the seal, swatting it with a paw that may weigh as much as fifty pounds."

Fortunately for tourists and naturalists who want to get a close look at wild polar bears, there is ready opportunity at Churchill, Manitoba. Large numbers congregate in fall along the seacoast from Cape Churchill west to Churchill, waiting for Hudson Bay to freeze over so that they can go out on the ice and hunt seals all winter long. Regular polar bear tours are now available and the number of travellers to Churchill in October and November has increased rapidly in the last few years. Many of the bears wander into the town where they have long been a problem. That problem, however, has largely been solved through the resourcefulness of the Manitoba Department of Natural Resources and town authorities: a large, multi-roomed jail has been constructed to house recalcitrant bears until the Bay freezes and they can be released, an effective public education system has been implemented, and a vigilant corps of Conservation Officers and RCMP have developed efficient ways of dealing with bears and people.

Davids writes: "The people in the town of Churchill, Manitoba, have proven that man can live happily — though sometimes precariously — with nature, if he chooses. Last time I lunched at the Churchill Café, I overheard someone say: 'Bears were here long before people.' The village council has no intention of eliminating polar bears, which add flavor, distinction, and excitement, something frontiersmen have always liked."

The photographs in the book tell a story in themselves. Guravitch, a

Polar Bears *Dan Guravitch*

Canadian from Ontario who now lives in Mississippi, is a superb photographer and his subjects are both powerful and endearing. I especially liked the photos chosen to show behavioral aspects: bears pacing, feeding, interacting with each other, even playing. The captions under a series of photos of four and then five bears read: "Ashore until hunting resumes, bears — even adult males — form lasting friendships, even to the point of sharing food ... When a stranger appears, the tranquility ends. Bear interactions are as stylized as a ballet."

Davids ends this marvelous book with these statements: All mankind has a stake in the arctic. For every species of plan or animal we exterminate by design or accident, we diminish the beauty, the excitement, the grandeur of our planet, reduce it to a life of asphalt and golf balls, survival and little else.

"How empty the arctic would be without its lordly bears. For me, every encounter with one is brushed with magic; I have the distinct feeling that I have had an audience with royalty. Here is a creature that doesn't shrink from the sight or sound of humans but accepts them as interesting fellow animals.

"A big female was buffeting my plastic container of water. I couldn't keep from shouting, 'Get away from here.' She left it and came up close, fixing her black eyes on mine. 'Why?' she seemed to be saying, 'What gives you authority over this land?' "
— Reviewed by *Robert W. Nero,* Wildlife Branch, Box 14, 1495 St. James St., Winnipeg, Manitoba. R3H 0W9